REPORT RESUMES

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DESCRIPTORS- *STUDY GUIDES, *TRADE AND INDUSTRIAL EDUCATION, *FLOOR LAYERS, *FLOORING, APPRENTICESHIPS,

THE INFORMATION IN THIS STUDY GUIDE WAS DEVELOPED FOR USE IN RELATED TECHNICAL INSTRUCTION IN APPRENTICE TRAINING FOR THE FLOOR COVERING TRADE. THE MATERIAL WAS WRITTEN BY TRADE INSTRUCTORS AND JOURNEYMEN UNDER THE DIRECTION AND COORDINATION OF THE STATE EDUCATIONAL ADVISORY COMMITTEE FOR THE FLOOR COVERING TRADE AND OTHERS. THE UNITS ARE (1) INTRODUCTION TO THE TRADE, (2) MATERIALS OF THE TRADE, (3) BLUEPRINT READING AND ESTIMATING, (4) SURFACE PREPARATION, (5) TILE LAYOUT AND INSTALLATION, (6) SHEET GOODS, (7) COVING SHEET GOODS, (8) SPECIAL JOBS, AND (9) REPAIR AND MAINTENANCE. EACH IS EXPLAINED BY AN INTRODUCTORY STATEMENT AND DIVIDED INTO TOPICS WHICH CONTAIN AN ASSIGNMENT FROM A SUPPLEMENTARY TEXT OR PAMPHLET, AN INTRODUCTION, A SECTION OF RELATED INFORMATION, AND CHECKUP QUESTIONS FOR STUDENT SELF-EVALUATION. A RECORD OF STUDENT PROGRESS MAY BE KEPT IN THE STUDY GUIDE INDEX. THE STUDY OF THIS 144-HOUR COURSE BY INDENTURED APPRENTICES ON A GROUP OR INDIVIDUAL BASIS IS TO BE DIRECTED BY A QUALIFIED JOURNEYMAN OF THE TRADE. LINE-DRAWING AND PHOTOGRAPHIC ILLUSTRATIONS ARE INCLUDED. A LIST OF SUPPLEMENTARY INSTRUCTIONAL MATERIALS INCLUDES FOUR RECOMMENDED BOOKS AND THREE FILMS. TESTBOOKS AND FINAL EXAMINATIONS ARE AVAILABLE TO INSTRUCTORS. THIS DOCUMENT IS ALSO AVAILABLE FOR $2.25 FROM BUREAU OF INDUSTRIAL EDUCATION, CALIFORNIA STATE DEPARTMENT OF EDUCATION, 721 CAPITOL MALL, SACRAMENTO, CALIFORNIA 95814. "FLOOR COVERING--PART 2, CARPETING," VT 002 992, IS ALSO AVAILABLE. (HC)

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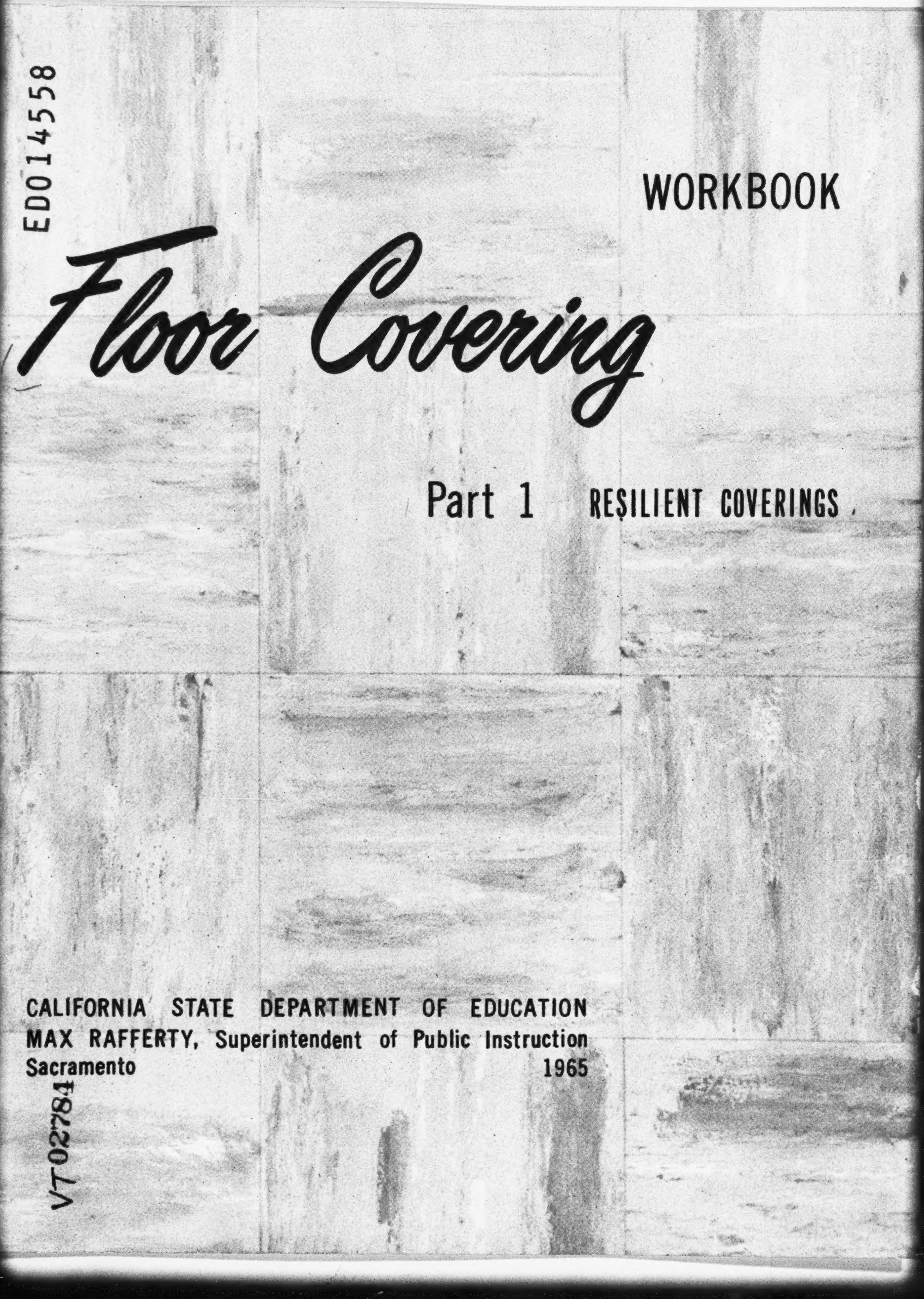

WORKBOOK

Floor Covering

Part 1 RESILIENT COVERINGS

CALIFORNIA STATE DEPARTMENT OF EDUCATION
MAX RAFFERTY, Superintendent of Public Instruction
Sacramento 1965

VT002784

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DATE: June 22, 1967

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Prepared under the direction of the Bureau of Industrial Education
California State Department of Education

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WORKBOOK

Floor Covering

Part 1 RESILIENT COVERINGS

Prepared Under the Direction of the
Bureau of Industrial Education

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Foreword

The provision of related courses for apprentices to supplement their training for the trade is a relatively recent development. Since these courses are highly specialized a comparatively few commercially prepared training manuals are available. The California State Department of Education has therefore developed manuals of this type that can be used by the schools for this purpose.

We are confident that the young men who have chosen to work in this trade and the journeymen who are instructing them will find participation in these courses both helpful and stimulating.

Max Rafferty

Superintendent of Public Instruction

Preface

The Bureau of Industrial Education has responsibility for making available the related instructional materials required for use in the training programs offered by the various trade groups in the state. The Bureau meets this responsibility by working cooperatively with employer-employee groups representing each of these trades to determine what materials are needed and to develop these materials.

This revised edition of Floor Covering, Part 1, was planned under the direction of the State Educational Advisory Committee for the Floor Covering Trade. The membership of the committee included the following:

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Ralph Dutter	Los Angeles	Max Weddle	Los Angeles
Thomas Bates	Oakland	Harlan Collins	Oakland
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and Soft Tile Crafts Joint Apprenticeship and Training Committee, served as technical advisors to the Bureau of Publications, State Department of Education. L. D. (Steve) Brodie and Howard Olansky, Los Angeles; William A. Brennan, Sacramento; and Pacific Floor Products, Sacramento and San Francisco, assisted in obtaining photographs and reference materials. Wallace Theilmann, Supervisor of Instructional Materials, Bureau of Industrial Education, coordinated the project activities.

J. Graham Sullivan **Chief, Division** **of Instruction**	**E. G. Kramer** **Chief, Bureau of** **Industrial Education**

Assignment Date

Contents

Page

Foreword iii
Preface v
Instructions for Checkup Questions ix

UNIT A INTRODUCTION TO THE TRADE 1
Topic
1 History of the Trade 3
2 Prospects of the Trade 6
3 Customer and Employer Relations 9
4 Safe Working Practices 13

UNIT B MATERIALS OF THE TRADE 17
Topic
1 Sheet Goods 19
2 Tile 22
3 Metal Products 25
4 Adhesives 30
5 Underlayments 34
6 Tools and Equipment 36

UNIT C BLUEPRINT READING AND ESTIMATING 45
Topic
1 Specifications, Schedules, and Codes 47
2 Floor Plans and Details 50

UNIT D SURFACE PREPARATION 55
Topic
1 Masonry Surfaces 57
2 Wood and Other Surfaces 62

UNIT E TILE LAYOUT AND INSTALLATION 67
Topic
1 Square Layout 69
2 Diagonal Layout 75
3 Square Installation 80
4 Diagonal Installation 89
5 Wet-Laying Procedures 91

Assignment Date

Page

UNIT F SHEET GOODS 97
Topic
1 Handling of Sheet Goods 99
2 Laying Out Measurements 103
3 Plain or Nondirectional Fields 111
4 Patterned Fields, Borders, and Feature Strips . . 116
5 Job Records 121

UNIT G COVING SHEET GOODS 127
Topic
1 Top-Set Base 129
2 Trimming Out 133
3 Pattern Scribing for One-piece Cove 141
4 Outside Corner Fills 145
5 Radius Cove 154
6 Border Cove 159

UNIT H SPECIAL JOBS 163
Topic
1 Coving Tile 165
2 Counter Tops 169
3 Wall Covering 175
4 Insets 178
5 Rotogravure Sheet Material 181
6 Static Conductive Floors 183

UNIT I REPAIR AND MAINTENANCE 187
Topic
1 Repair of Floor Covering 189
2 Maintenance of Floor Covering 194

INSTRUCTIONAL MATERIALS 195

Instructions for Checkup Questions

Checkup questions appear at the end of each topic in the workbook. Answer the questions for each topic as soon as possible after you finish studying the assignment. Remember that although you are not graded on the checkup questions, your ability to answer them correctly can show you how well you understand the information and assignments in the topic preceding them.

Checkup questions of the following types appear most often throughout this course: true-false, completion, and group discussion.

True-false questions are statements followed by the letters T and F. If you believe the statement is more nearly true than false, circle the letter T. If you believe it is more nearly false than true, circle the letter F.

Completion questions are sentences in which certain key words are omitted. A numbered blank is placed in the right-hand margin to correspond to each of the missing words. Write the required word in the blank with the correct number.

Group discussion questions are direct questions intended to stimulate class discussion. However, if the instructor indicates, the answers may be written.

Other types of questions may appear from time to time. When this is the case, directions will be given for their use.

unit A

INTRODUCTION TO THE TRADE

Among the professions to which man has devoted himself throughout history, the floor covering trade is relatively new. It is one which requires a considerable amount of manual skill, and offers the craftsman great satisfaction in a job that is well done.

Resilient floor and wall covering is a fast growing business. For many years there has been a steadily increasing growth of sales in this line of work, and all indications point to a continuation of this trend at the same rapid rate. There is a good, well-paying future in this expanding field for the competent journeyman, since the shortage of trained mechanics is greater than ever before.

This unit presents some of the advantages and prospects of this challenging and rewarding trade.

TOPIC 1— HISTORY OF THE TRADE

Introduction

- How was linoleum developed?
- What led to the popularity of cork tile?
- In what forms has asphalt flooring been used?
- What are the two newest floor covering materials?
- What are the principal features of vinyl products?

The floor covering trade as we know it today is about one hundred years old. As in all trades, new materials are continually being introduced and new methods tried, some to be abandoned, others to be adopted as standards in the industry. The installer of these materials must be completely familiar with the products and procedures in use and keep constantly up to date on new products as they appear.

Related Information

Linoleum. Linoleum has the longest history of any of the resilient products in current use. It was developed quite by accident in 1862 by Fredrick Walton, an English inventor. Walton had been experimenting with various oils, varnishes, and fibers, in an attempt to design an artificial bookbinding material which would simulate Florentine leather. He noticed the rubbery skin which appeared as a result of oxidation on the surface of a can of linseed oil. After another three years of further experiments and mounting debts, Walton discovered that this oxidized oil, combined with Kuari gum, resins, and cork, made a durable, sanitary floor covering. Where and by whom it was named is somewhat obscure. There are accounts of its being called "kamptulicon" sometime during the 1860's. The name linoleum, however, applied quite early, is derived from the Latin words "linum" (for the flaxen fibers) and "oleum" (oil) Walton spent forty years in its manufacture and further development.

Cork tile. While other floor covering products have come and gone during the years between Walton's invention of linoleum and the turn of this century, cork tile is the only one invented during this period that has endured to the present. The manufacturing process was at first so slow and expensive that the total annual volume in 1920 was only about 200,000 square feet; by 1927, only 3,000,000 square feet. During the depression of the 30's and World War II, cork tile almost disappeared from the market, and it was not until 1945 that its production was resumed by several manufacturers. The introduction of improved manufacturing processes and the increased demand for this tile since that time have resulted in a substantial reduction in its price.

The introduction of synthetic resins allowed manufacturers to produce a thinner cork tile with a superior wearing surface. Prefinishing then became the normal method of production and was no doubt a further key factor in reducing the cost, since prior to this time, cork tile had been laid on the job, sanded, and then finished with varnish and wax. While cork tile is still widely used, its peak of popularity was reached in the mid-1950's, when annual production exceeded 15 million square feet.

Asphalt tile. The early 1900's also saw the birth of a product which proved to be the forerunner of asphalt tile. This flooring material was known as "troweled-on mastic flooring." It had a consistency similar to heavy paint and consisted of a mixture of Gilsonite asphalt, asbestos fiber, and naptha solvent. It was applied in a series of 5 to 8 troweled-on coats, depending upon the thickness required. It had good wearing qualities and some resilience, but its outstanding feature was its stability for application to on-grade and below-grade concrete. Negative factors included limited colors, difficult maintenance, lack of uniformity in thickness, and difficulty of patching in case it wore through. In the early 1920's some of the people engaged in the manufacture, sales, and installation of troweled-on mastic flooring began to produce the same material in the form of tiles fabricated to definite size and thickness so it would be easier to apply and repair. This became the asphalt tile we know today.

Vinyl-asbestos tile. Vinyl-asbestos tile appeared after World War II. By that time, asphalt tile had advanced to the stage where asphalt and Gilsonite resins had been replaced with coumarone-indene resins. From there it was a natural step to the inclusion of vinyl resins, which make vinyl-asbestos tile greaseproof, more flexible, and much easier to maintain.

Vinyl tile and sheet goods. Both of these plastic products are newcomers, relatively speaking, having also appeared after World War II. Vinyl plastics in both tile and sheet form are today's fastest growing line of floor covering. Translucent, transparent, embedded, floating chip, and other widely varied styles of vinyl are most popular today for both floor and counter covering. History will undoubtedly show that the introduction of plastics in this field was a development second in importance only to that of the development of linoleum.

Seamless resilient flooring. The newest major addition to floor covering -- seamless resilient -- has made several appearances in various forms over the years. Many attempts have been made to provide the ingredients of resilient floor covering in liquid form, easily applied directly to the floor, where it would "cure" or set up to become a floor covering with all the beauty, durability, and comfort required of modern floor covering. Although modern asphalt tile began as an outgrowth of an unsuccessful "spread-type" material, the search has gone on, and there are now several products on the market, one or more of which could be the answer to this old problem. Men in the floor covering trade should keep an open mind and avail themselves of all opportunities to learn everything possible about this type of floor covering as it continues to be improved and refined.

Checkup

The floor covering trade is one which requires a great deal of ___1___ ___2___.

1. ________
2. ________

Linoleum was invented by ___3___ ___4___.

3. ________
4. ________

The original linoleum was a combination of oxidized ___5___ ___6___, kuari gum, ___7___ and ___8___.

5. ________
6. ________
7. ________
8. ________

One of the important manufacturing advances in the production of cork tile was the introduction of ___9___ ___10___. This development allowed manufacturers to produce a(n) ___11___ tile with a superior ___12___ ___13___.

9. ________
10. ________
11. ________
12. ________
13. ________

In its years of peak popularity, cork tile reached an annual production level of ___14___.

14. ________

The forerunner of asphalt tile was known as ___15___ - ___16___ ___17___ flooring.

15. ________
16. ________
17. ________

Vinyl resins in vinyl-asbestos tile make it ___18___ - ___19___, more flexible, and easier to ___20___.

18. ________
19. ________
20. ________

TOPIC 2— PROSPECTS OF THE TRADE

Introduction

- How do working conditions in the floor covering trade compare with those in other building trades?
- What are the prospects for advancement in this and related fields?
- What is the required investment in tools?

The floor covering trade can be an interesting and rewarding line of work for the man who takes pride in true craftsmanship. New materials, new techniques, and new problems are always arising, and the skilled artisan can take justifiable pride in a well-done job and a personal satisfaction that is over and above the financial rewards that are expected from any job.

Related Information

A career in floor covering offers:

- Steady employment
- Indoor working conditions
- Above-average wages
- Excellent opportunities for advancement
- Relatively high degree of job safety
- Paid on-the-job training

Conditions in the trade. Unlike some building trades, floor covering work is rarely interrupted by bad weather; sometimes the start of a job is delayed because other "exterior" trades have not been able to meet a schedule, but generally this work is not considered seasonal. This means that a good mechanic can look forward to year-round employment, contingent only upon prevailing economic conditions.

The work is nearly always done indoors, under temperature conditions considered in the "comfortable" range--seldom where the temperatures are extreme. Another advantage of the trade is that the cleanest of working conditions are always necessary.

Wages for crafts within the building trades are relatively high, mainly for two reasons: (1) building trades are well organized by labor unions, which places them in a strong collective bargaining position; and (2) wage scales for the trades are based on the premise that full employment is not available throughout the year. As a result of the latter, the wage rates are set 10 to 20 percent higher to compensate for anticipated "bench time." Wage scales for the floor covering trade are above the overall building trades average, and this, along with below-average unemployment, adds up to a healthy gross annual wage.

Other compensations to be taken into account are such fringe benefits as health and welfare insurance, pension and vacation plans, mileage and travel time, overtime differentials, paid holidays, and so on. Admittedly all of the benefits do not exist in all areas, but they are so well accepted today that they are fast becoming standard.

The construction trades are considered somewhat hazardous. However, there are relatively few hazards in the floor covering trade, and those are produced by using the required tools.

Apprentice training offers an ideal way of learning the trade while being paid on-the-job training, plus regular classroom instruction under professional supervision, provides excellent opportunity to learn a life-time trade.

The initial investment necessary to enter the trade as an apprentice is a modest one--about $40 to $50 will cover the cost of the tools needed to begin the required training. Then as one advances in the trade he will have to purchase additional tools. Eventually, an entire set of hand tools will be acquired at a cost of approximately $200.

The importance of being provided with all the necessary tools is exceeded only by the necessity of keeping the tools in good shape. A craftsman is frequently judged by a prospective employer by the condition of his tools. A man who keeps his tools orderly, and in good repair is usually an orderly and competent craftsman.

Eventual possibilities. After a number of years in the trade the man who prepares himself will find open to him such positions as foreman, cutter, salesman, measureman, or owner of an independent business.

For men who show leadership and are willing to put in extra time, positions are open in organized labor, including both paid and unpaid, part-time and full-time positions. Among these are elective offices of the local union, executive board and committee memberships, and jobs as business representatives.

The floor covering trade is like many others in that, having acquired the basic mechanical skills, a desire to learn new methods and techniques, a determination to do the best possible job, and the ability to get along with customers and fellow workmen alike, the installer can take pride in his job and look forward with reasonable assurance to advancement.

Checkup

Wage rates in the building trades are based on the assumption that full-time work is not always available.	1.	T	F

Generally speaking, floor covering installers earn more money over a full year than workmen in most other building trades. **2. T F**

Weather conditions often cause unemployment among floor covering installers. **3. T F**

The floor covering installer may plan on a maximum investment of $40 for tools. **4. T F**

Trade practice dictates that the apprentice should use the hand tools of the journeyman on the job. **5. T F**

One disadvantage of the trade is the frequent need to work in extreme temperatures. **6. T F**

Floor covering work ranks relatively high in the list of hazardous occupations. **7. T F**

An employer of floor coverers may consider the condition of the prospective employee's tools as indicative of his competence as a craftsman. **8. T F**

TOPIC 3— CUSTOMER AND EMPLOYER RELATIONS

Introduction

- Why is the installer's personal appearance on the job an important consideration?
- How might an installer make the best impression on a customer?
- Why is proper cleanup essential?
- How can an employee help hold the shop owner's problems to a minimum?.

Although the importance of knowing how to do a job, coupled with the ability to put this knowledge into practical use, must be stressed, it is also important for a workman to know how to get along with his fellow workers, his employer, and the customers he serves.

Since a floor covering installer is often called upon to work directly with the customer, his personal appearance and conduct are extremely important and determine in large part how well he will get along on the job. His ability to get along with customers and his attitudes, habits, and general demeanor in the shop will determine to a large extent the length of his employment and his chances for advancement.

Related Information

Customer Relations

An installer's reputation will be established primarily by the quality of work produced. Customer good will is attained when the quality of the workmanship, as well as that of the material, is above reproach.

The personal appearance, conduct, and working habits all tend to reflect upon the firm for which the installer works. Job problems and deviations from the job schedule should be discussed with the foreman. The installer must always keep in mind the fact that "good public relations" is important to his employer, and that he, the workman, is an important member of the team responsible for these relations.

Handling of customer's property. On most residential jobs the installer must handle some furniture. Heavy pieces of furniture should be moved on a set of coasters or carpet strips. Care should be taken to avoid damaging the furniture, the walls, and woodwork. Furniture left in the work area and builtins should be covered while old floor covering is being removed. In confined areas care should be taken to avoid soiling the walls with shoe or felt paper marks. In case some damage occurs, repair the damage immediately, or if this is not possible, inform the customer when the correction will be made. Consideration for the customer's property will gain the customer's confidence.

Cleanup. Keep the working area clean by throwing scraps and other discarded material in a carton or other container. Inspect the installation thoroughly and make any necessary changes before the job is declared completed. Generally, left-over materials belong to the shop and should be removed from the job unless the shop has given other instructions. All furniture should be replaced as carefully as it was removed. If the customer is present when the job is completed, thank him for the opportunity he has given your employer and remind him that future business will be appreciated.

Employer Relations

The specialty shop owner is faced with many difficulties. He must maintain an adequate and competent staff of workmen, and to do so he must maintain a steady flow of work. To secure the necessary work he must bid competitively and maintain an attractive place of business. Then he has the additional problems of providing the tools and equipment required for various types of installations and financing his operation, while realizing a reasonable return on his investment.

Proper attitude. All the things an employee should or should not do would be difficult to enumerate, but if his mental attitude is good, what he does will generally reflect in his favor. An employer cannot help being impressed with a worker who dresses neatly, handles and cares for his tools properly, and runs a job in a clean, orderly, and workmanlike manner.

Morale is an important factor in the success of an organization. Pleasant working conditions result when both employer and employee morale is high. An installer should accept any work assignment--no matter what it is--in the right spirit. There are good and bad jobs, and all employees must be willing to accept a fair amount of the bad without complaint. In all instances he must employ his craftsmanship to the best of his ability, give a full day's work for his day's pay, and always keep the welfare of his employer and the employer's customer in mind.

An employer must know how long a job should take for he must bid accordingly. Occasionally, of course, unforeseen circumstances will require the use of additional time. An employer expects this, although frequent occurrences of this kind may raise a question in his mind as to the competence of his employee.

Advancement. When opportunities for advancements occur, the man who is a good worker and well versed in his trade will qualify for advancement before the man who is not, provided he possesses desirable personality traits. The employer will most likely seek answers to the following questions as a basis for determining which of his employees merits advancement.

- Does the installer know his trade thoroughly?

- Is his appearance neat?
- Can he handle responsibility?
- Does he get along with his fellow installers?
- Are his relations with the public beyond reproach?
- Is he efficient?

Regard for equipment. An employer invests a large sum of money in his establishment, including the tools and equipment required. His provision of tools and equipment makes it possible for his employees to do their work with a minimum of investment in tools. The employee must, however, exercise care in the use of the employer's tools and equipment just as he would if they were his own.

An installer who has no regard for tools and equipment shows little regard for his trade. Wastefulness of materials on a job increases the employer's costs and reduces his profits. He hires his workmen in good faith and expects them to help earn a profit for him.

Vehicles supplied by the company for transportation of workmen and materials should be driven carefully and kept orderly and clean. All heavy equipment should be handled properly. Heavy rollers should be lowered from the truck to the ground, not dropped. The sanding machine bag should be emptied before the machine is loaded for return to the shop.

Personal responsibility. Every installer has a moral obligation to his employer. If he is assigned as a lead man on the job, he must see to it that every installer under his supervision is kept busy during working hours. Skilled workmanship and good pay go hand in hand. A skilled installer who produces good work meets this moral obligation in many ways, and in so doing gets the satisfaction that he seeks as a master craftsman.

Checkup

The dependability of each employee has a bearing on the shop owner's ability to stay in business.	1.	T	F
The word neatness, applied to a floor covering installer, refers mainly to personal appearance.	2.	T	F
A job may occasionally take more than the employer estimated.	3.	T	F
Efficiency is the sole consideration for advancement.	4.	T	F
The installer must provide all the tools used on the job.	5.	T	F
The installer's manners are his own business and no reflection on the shop for which he works.	6.	T	F

In the event of a material shortage on the job, the installer should ask the customer to inform the shop. **7.** **T** **F**

The customer should be made to understand that when furniture must be moved it will be done at his risk. **8.** **T** **F**

It is customary for the installer to remove remnants from the job. **9.** **T** **F**

A careful cleanup gives the installer opportunity to make a thorough inspection of the job. **10.** **T** **F**

TOPIC 4— SAFE WORKING PRACTICES

Assignment * Construction Safety Orders, Division of Industrial Safety, California State Department of Industrial Relations, Sec. 1601-11 and 1680.

Introduction

- Is the floor covering trade particularly hazardous?
- What general safety practices should be kept in mind at all times?
- What is the safest way to handle heavy rolls of material?
- What are the special hazards related to working with mastics?

General safety practices for the building trades may be found in Construction Safety Orders and other publications of the Division of Industrial Safety, as well as in the Introduction to Apprenticeship. Every workman should learn and employ these practices.

Although it is true that the floor covering trade is one of the least hazardous of the building trades, it still must be remembered that hazards do exist and must be taken into account if on-the-job injuries are to be avoided. Floor covering installers work with electrical tools--saws, drills, sanders, and the like--and also with a variety of knives. The use of epoxy resins and other volatile mastics is common in the trade. These activities present a variety of hazards.

Many agencies and groups are interested in the safety of the workman. Among them are employers, labor unions, insurance companies, safety councils, and the State Division of Industrial Safety. Much time and money is spent by these groups each year to reduce hazards on the job, call to the attention of each workman the safety hazards he faces, and promote new and better safety practices everywhere. It is the wise workman who becomes and remains aware of all threats to his health and general welfare, for upon this awareness depends his continued livelihood.

Related Information

General Safe Working Practices and Precautions

- Wear proper work clothes. Shoes with thin or worn soles are dangerous to wear, since they offer little protection against sharp objects, such as nails. Pants or overalls with torn, bulky, or turned-up cuffs should never be worn because they are likely to catch on some projection and cause a fall or other accident.

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* For publication information, see the list of instructional materials in the back of this book.

- Wear the personal protective equipment that is supplied for the job. Wear knee pads when kneeling for long periods or around sharp objects of any kind. Always wear respiratory equipment when working in any area where dust particles or other matter is floating in the air.

- Lift objects correctly. The human back is not a crane. The back should always be kept in a straight position and the lifting done with the leg and thigh muscles. Never attempt to lift any object that is obviously too heavy for one man to handle.

- Practice good housekeeping. Tools, materials, and scraps left around the job can cause accidents. Keep tools in tool boxes and pile material neatly away from passageways and working areas.

Special Safety Precautions

Handling heavy materials. Handle heavy materials carefully. Heavy rolls of sheet goods, boxes of floor tile, and other heavy objects should always be handled with proper care to avoid injury.

- When handling rolls of sheet goods, use a standard four-wheel hand truck, designed to carry heavy cylindrical material. If such a truck is not available, an ordinary two-wheel warehouse truck may be used, providing it is large enough and has wide, parallel frames. A concave centering block should be bolted to the top of the cross bar of the truck frame to help keep the load centered for good stability. The upper part of the roll being carried should rest on either the shoulder or the arm of the operator.

- Hand trucks should never be run along an incline; that is, perpendicular to the angle of an incline. The pathway the truck is to follow should always be clear of trash and other obstructions that could tilt the load or otherwise throw it out of balance.

- When trucking heavy loads, always walk facing the load.

- If the roll being trucked gets out of control and starts to fall, stand back and let it go. Do not attempt to catch it.

Electrical equipment. A floor covering installer is often required to operate electrically-powered saws, sanders, and buffers. The use of such equipment always carries with it the danger of electrical shock. Electrical shock is always dangerous and sometimes fatal; in addition, secondary human reaction to any such shock causes many injuries.

Never touch a person or any equipment in contact with a live power line until the power has been shut off. A victim should be given first aid and a doctor called immediately.

When operating electrical equipment, observe these basic precautions:

- Be sure hands are dry. If it is necessary to work on a wet or damp surface, wear rubber-soled shoes and rubber gloves.
- Use only heavy-duty extension cords and inspect them before use. If damaged insulation or fittings are present, repair or replace them.
- Do not hang or bend an extension or any other power cord across nails or any sharp surface. Do not run cord where it is in contact with a wet surface or where any vehicle can run over it.
- Make certain that all portable electrical tools, such as saws and drills, are grounded. If a ground has not been incorporated in the design of the equipment (three-wire tools are of the grounded type) use an extra wire to ground the casing of the equipment to a water pipe.
- Some sanding machines and buffers have fuse plugs. If a fuse should blow, do not replace it without first disconnecting the machine from the power source.

Cuts and abrasions. Floor covering installers use knives a great deal of the time. The proper use of knives--as well as their proper storage--will help prevent cuts. But should cuts or abrasions occur, they should be taken care of at once. This is a responsibility you owe to yourself and to your employer. First aid means just what it says--do it first, continue the job afterwards if no further treatment is indicated.

Elevators and hoists. Construction material elevators and hoists are used only for carrying materials, not for carrying passengers. No one is permitted to ride in them (except to repair guides or oil moving parts). Only construction elevators and hoists specifically designed and designated to carry passengers should be used by workman.

Chemical hazards. Several cements and mastics used in the floor covering trade are either flammable or toxic, or both. The following safety precautions should be observed whenever handling or working with adhesives:

- Before using any adhesive, make certain that the material in the container is the same as that described on the label. Avoid transferring adhesives from an original container into one with a different label or no label at all.
- Prior to using any adhesives, review the instructions for their use carefully.
- Use adhesives only in areas where the ventilation is adequate and avoid any prolonged breathing of the fumes.
- Avoid getting adhesives in prolonged contact with the skin. If any of the material does get on the skin, remove it with solvent (if necessary) and then wash the skin thoroughly with plenty of soap and water.

- **Do not use flammable adhesives in any room where there is an open flame, such as a gas pilot light or a burning blow torch. Make certain also that the fumes from the adhesive are not allowed to drift into another closed room where an open flame exists.**

- **Wash hands thoroughly after using adhesives, particularly before eating or smoking.**

Checkup

When lifting, the back should always be kept ___1___. **1.** ______

Whenever possible, a ___2___-wheel hand truck should be used to carry rolled sheet material. **2.** ______

When moving heavy loads on a hand truck, the operator should always walk ___3___ the load. **3.** ______

If it is necessary to work on a wet or damp surface when operating electrical equipment, rubber-soled shoes and ___4___ ___5___ should be worn. **4.** ______ **5.** ______

Extension cords should always be inspected before use for damaged ___6___ or ___7___. **6.** ______ **7.** ______

All portable electrical tools should be of the ___8___ type, or precautions taken to make them so. **8.** ______

Before a fuse is replaced in a sanding machine, the machine must be ___9___. **9.** ______

Adhesive should never be used from a(n) ___10___ container. **10.** ______

unit B

MATERIALS OF THE TRADE

Resilient floor covering products are long wearing, relatively inexpensive materials designed to cover almost every kind of floor. Because of easy maintenance, wide decorative possibilities, and low replacement cost, they are the most widely used of all floor coverings. Known in the trade as "hard-surface" materials, they are supplied in two principal forms: sheet goods and tile.

Many related materials and tools have been developed to facilitate the installation of these products and this unit describes these in general use today.

TOPIC 1— RESILIENT SHEET GOODS

Introduction

- In what forms is linoleum available?
- What are the advantages of felt base?
- In what respect has sheet vinyl changed the floor covering trade?
- What is "rotogravure vinyl" as applied to floor covering?
- What is meant by "seamless resilient" floor covering?

The oldest and best known resilient floor covering is linoleum both of the inlaid and "print" variety. The latter is not linoleum in a technical sense, but a substitute product. Sheet vinyl and "roto-vinyl" are newer products and not so well known, but both have gained wide popularity over the past decade. Since the word "linoleum" has long been a household word and is used by the public to describe virtually any hard-surface floor covering, some confusion is to be expected. Resilient sheet materials can be placed in four main categories: inlaid linoleum, felt base (or "print linoleum"), sheet vinyl, or roto-vinyl.

As the word "resilient" implies, products thus labeled will generally withstand considerable shock and pressure without being permanently deformed. In floor covering, these qualities have great value for they result in long and satisfactory service. Such resiliency has an added advantage, especially when the covering is laid over a hard surface such as concrete or steel, a value which may be best expressed in terms of comfort; not only is the resilient material comfortable to work on, but noise level is reduced considerably.

The great variety of designs, colors, and textures of resilient floor covering materials on the market add to their popularity for both commercial and residential use.

Related Information

Standard Products

Inlaid linoleum. Inlaid linoleum is most frequently used in sheet form, although its use as tile is not uncommon. As yard goods this linoleum is manufactured only in 6' widths and is obtainable in three gauges: 1/8" (burlap backing), standard (usually .090"), and light (also known as "service gauge," usually about .070" to .065"). The latter two gauges have felt backing rather than burlap. Generally speaking, the 1/8" gauge is considered to be commercial grade and the lighter gauges are recommended for most residential use.

The main ingredients used in the making of inlaid linoleum are linseed oil, cork and wood flour, resin, and color pigment. The great variety of designs and colors available make matching decorative schemes an easy job. Linoleum is used primarily in commercial buildings and in the kitchens, bathrooms, service areas, and family rooms of residences. It is also used extensively on counter tops and walls.

Linoleum may be installed on suspended wood, concrete, terrazzo, and tile floors; it should not be installed on below-grade or on-grade floors. It is easy to work with, exceptionally durable, and easy to maintain.

Felt base. Felt base is commonly called "print linoleum," although this is misleading since it is not linoleum at all. It is simply a printed, baked-on enameled surface on a saturated felt base. The term "felt base" should not be confused with "felt backing" as used with inlaid linoleum. Felt base is available in 3', 6', 9', and 12' widths and 2' wide "runners" in hardwood patterns. These runners are used mostly around linoleum or felt base rugs to give the appearance of a hardwood floor.

Felt base may be loose-laid or cemented to the floor, either method being entirely satisfactory. Most of the goods available in this material have a distinct pattern and require careful matching at the seams; in fact, almost every pattern in inlaid linoleum is also available in felt base. Felt base is a satisfactory economy floor covering for residential use and has exceptional durability.

Sheet vinyl. An extensive line of sheet vinyl floor coverings have been marketed in recent years. This material has added greatly to the use of resilient floor covering, not only because its wide range of colors and patterns are to be found in no other product, but because it can now be installed on floors at any grade level with special water-resistant asbestos backing and latex base adhesives. Through the use of transparent vinyl layers, the illusion of depth is achieved as well as such variations as "floating chips" which add even more to the three dimensional affect.

Sheet vinyl is available only in 6' widths, has proven to be exceptionally long wearing and is easily maintained. It does not however have the dimensional stability of linoleum, nor the resistance of linoleum to static loads. Sheet vinyl is somewhat more difficult to work with than linoleum, mainly because of its greater density, but the required techniques are easily mastered.

Roto-vinyl sheet goods. Roto-vinyl sheet goods are produced by the rotogravure printing process. The felt backing is printed with the desired design and then covered with a thin, transparent layer of vinyl plastic. The finished product is attractive, long wearing and, like print linoleum, may be cemented to the floor or loose-laid. It may only be installed, however, on suspended floors. It is available in 6', 9', and 12' widths for field applications; 2', 3', and 4' widths are also available for use as borders or runners.

Special Products

Mastipave. Mastipave is a heavy duty felt base sheet goods with a tough resin wear surface. It is manufactured in 3' widths in a limited number of plain colors and is used in industrial areas and heavy equipment rooms where the floor surface may be subject to moisture and oil deposits.

Seamless resilient. The newest hard-surface floor covering product, seamless resilient, is a solid coat of material applied in a semiliquid form which produces a single, monolithic floor covering consisting of such substances as vinyl, fiber glass, or a combination of resins.

Seamless resilient materials are applied in various ways--they may be troweled, sprayed, or brushed on. Most of them may be applied to any type of room in commercial, residential, or industrial structures. Some of them are also used for exterior applications and are gaining some popularity as business entrance walkways.

The thickness of the finished covering depends upon the number of coats applied. This material is reputed to withstand the damaging effect of stiletto heels much better than conventional sheet materials, and at least one manufacturer adds a special rubbery compound which increases the resiliency of the product well beyond the limits of other materials.

Checkup

Linoleum is manufactured in five gauges. 1. T F

Linoleum is considered as a nonresilient product. 2. T F

Linoleum of 1/8" thickness is usually manufactured with a felt backing. 3. T F

Patterns and colors available in linoleum are practically unlimited. 4. T F

Felt back linoleum is designed specifically for on-grade concrete floors. 5. T F

Felt base linoleum is manufactured in several widths. 6. T F

Print linoleum is considered to be a luxury floor covering. 7. T F

Sheet vinyls with asbestos backing may be installed on below-grade concrete floors. 8. T F

All sheet vinyl patterns are translucent. 9. T F

The manufacture of roto-vinyl sheet goods involves a photographic process. 10. T F

TOPIC 2– RESILIENT TILE

Introduction

- Why has resilient tile become so popular?
- What are the primary uses for asphalt tile?
- How does vinyl-asbestos tile differ from asphalt tile?
- Are linoleum tile and lino tile the same?
- What are the characteristics of vinyl tile?

Resilient tile or "soft tile" is produced in this country in huge quantities. It is made from many different materials and its cost ranges from the lowest to the most expensive of all the hard-surface materials that are used in the floor covering industry.

Tile has won wide acceptance in commercial installations because worn or otherwise damaged tile can be replaced without causing a patched appearance.

Resilient materials in tile form are usually less expensive to install than the same materials in sheet form, especially when the shape of the floor area is irregular or a custom design or regular block pattern of many different colors is desired.

Related Information

Asphalt tile. Asphalt tile derives its name from the base material of the tile, which was originally an asphalt compound. This type of tile was at one time available only in dark brown and black; however, it is now available in light, attractive colors.

Asphalt tile, resistant to moisture and alkalis, is designed primarily for installation on on- or below-grade concrete floors; however, it may also be installed on suspended floors. This tile is used most frequently in commercial areas or on floors of homes built on concrete slabs, less frequently in kitchens and bathrooms with wood floors. Asphalt tile is available in many sizes and colors, the usual size being 9" × 9", in thicknesses of 1/8" and 3/16".

Vinyl-asbestos tile. Because of its physical properties, size, and decoration, vinyl-asbestos tile is sometimes mistaken for asphalt tile, but the two are made of different ingredients. Vinyl-asbestos tile is composed mainly of vinyl resins, asbestos fibers, binders, and color pigments. It is marketed in several sizes, with thicknesses of 1/16", 3/32", and 1/8".

Vinyl-asbestos tile is more pliable than asphalt tile, but it is more susceptible to indentation, especially when subjected to high temperature such as that produced by radiant heat. It is designed primarily for installation on concrete floors of any grade level.

Cork tile. Cork tile is made from the bark of an East African tree. It forms an extremely resilient, quiet, and easily maintained floor covering. The cork material is ground up and then bound together under heat and pressure with its natural resins or with added chemical resins. This product was originally designed for installation on wood floors, but new adhesives have made it possible to use cork tile on on-grade and above-grade concrete floors as well, even where radiant heat is present. It is particularly appropriate for the floors of reception rooms, doctor's offices, libraries, hallways, conference rooms, and most areas of the home.

Cork tile comes in various sizes from 6" × 6" to 12" × 24", and in thicknesses of 1/8", 3/16", 1/4", 5/16", and 1/2". It is normally produced in three shades: light, medium, and dark. A random pattern design may be attained by using all three shades in combination.

Rubber tile. Rubber tile is an extremely resilient and luxurious floor covering product. It is unlike most of the other products, being dense in composition and quite pliable. The basic ingredient is rubber, with fillers and color pigments added. The color runs through each tile, eliminating the possibility that the pattern will wear off.

Rubber tile is manufactured in several sizes, with thicknesses of .080", 3/32", 1/8", and 3/16". It may be installed in both commercial and residential areas except on below-grade floors. For underfoot comfort and quietness it is second only to cork tile.

Linoleum and lino tile. Linoleum tile and lino tile are similar in that they are both made from the same surface material and neither one should be installed on other than an above-grade floor. Here the similarity ends, for linoleum tile is cut from standard gauge linoleum sheet goods of .090" thickness, and lino tile, which is manufactured without a backing, is 1/8" thick, and the color runs completely through it.

Vinyl tile. Vinyl tiles, of plastic resin composition and sometimes referred to as homogeneous vinyls, are a rather recent addition to the list of floor covering products and are supplied in many varieties. Some vinyl tiles are "full-thick" vinyls, others are surface vinyls on felt or rubber backing.

Vinyl tile is manufactured in many colors. Many of the tiles are made by applying photographic reproductions of other materials to the backing and coating this with clear vinyl.

In the full-thick vinyls, almost any style or pattern may be reproduced. Opaque colors can be marbleized, with results that are similar to the patterns used in rubber, lino tile, or terrazzo. Also, with a texture added to the surface of the tile, an effect such as that of slate or brick can be attained. Wood grain effect can also be developed by using this procedure.

Vinyl tiles, manufactured with a translucent vinyl for a three dimensional effect, are among the most attractive of the hard-surface floor coverings.

Originally, most vinyls were made for use only on above-grade floors of all types. Now that certain new adhesives are available, most vinyl tile can be installed on on-grade concrete floors, even those containing radiant heat installations. Some vinyls, applied with certain adhesives, are suitable for installation at all grade levels.

Vinyl tile is available in three thicknesses, 1/16", .080", and 1/8". These tiles were designed originally for use only on floors, but in recent years they have been widely accepted for use on counter tops, including those with sinks.

Checkup

Tile is used on many jobs because worn or damaged areas are easy to repair. 1. T F

The labor cost is generally greater on tile than it is on sheet goods. 2. T F

Asphalt tile may be used on wood floors in a residential installation. 3. T F

Vinyl-asbestos tile is similar in appearance to asphalt tile. 4. T F

Vinyl-asbestos tile is used above grade only. 5. T F

Cork tile makes one of the best floor coverings in a room where quiet is desired, such as a library. 6. T F

Rubber tile is usually made with a felt back. 7. T F

It is undesirable to use rubber tile for coving as it is too difficult to bend into the cove. 8. T F

Many commercial installations use lino tile, because it has a thicker wear surface than linoleum. 9. T F

Vinyl tile has received wide acceptance because it is made in more patterns and colors than is possible with other tiles. 10. T F

All of the vinyl tiles have a smooth glossy finish. 11. T F

Vinyl tile may be used on grade or below grade. 12. T F

TOPIC 3— METAL PRODUCTS

Introduction

- What are the types of metal trim most commonly used in the floor covering trade?
- What are the common types of cap moulding in use today?
- How are T-type sink rims installed?
- What is a tap-down trim and how does it work?

With the increased use of hard-surface floor covering materials, metal trims became a major item needed for the installation of floor coverings, drainboards, tub enclosures, and the like. When flash coves, drainboards, shower stalls, and numerous other innovations were coming into vogue some 30 years ago, a further need developed for metal trims of even more types. Today there are at least 150 different types of metal trims used in the floor covering industry.

The metals used in the floor covering trade are of three main kinds--chrome, aluminum alloy, and stainless steel. When first introduced, metal trims were made of an aluminum alloy, which, when rubbed, would leave dark stains on clothes and hands. Aluminum trims of today no longer have this trait since they are now given a final chemical treatment called "anodizing," which produces a finish that ensures the highest standard of quality and endurance.

The types of trim most commonly used are cap mouldings, nosings, edgings, bindings, dividers, T-metal, and cove mouldings.

Related Information

Sink frames. T-type rims for sinks are quickly and easily installed. Sanitary and watertight, they are completely self-sealing. No rabbeting or scribing is necessary, and no special tools are required. The frame is installed after the top covering material has been applied, making later removal possible without damage to the top material.

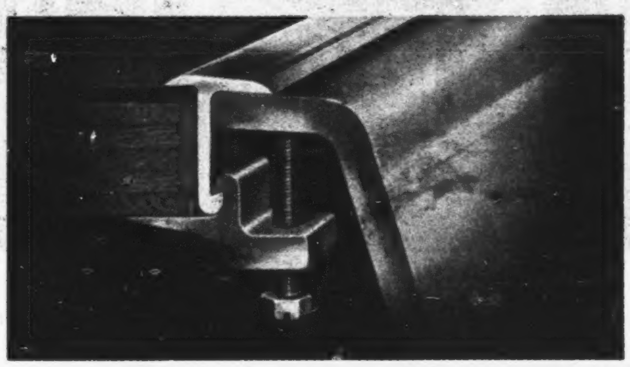


Fig. 1. T-type sink rim

Cap mouldings. The seven basic styles of cap mouldings most popular today are shown in Fig. 2.

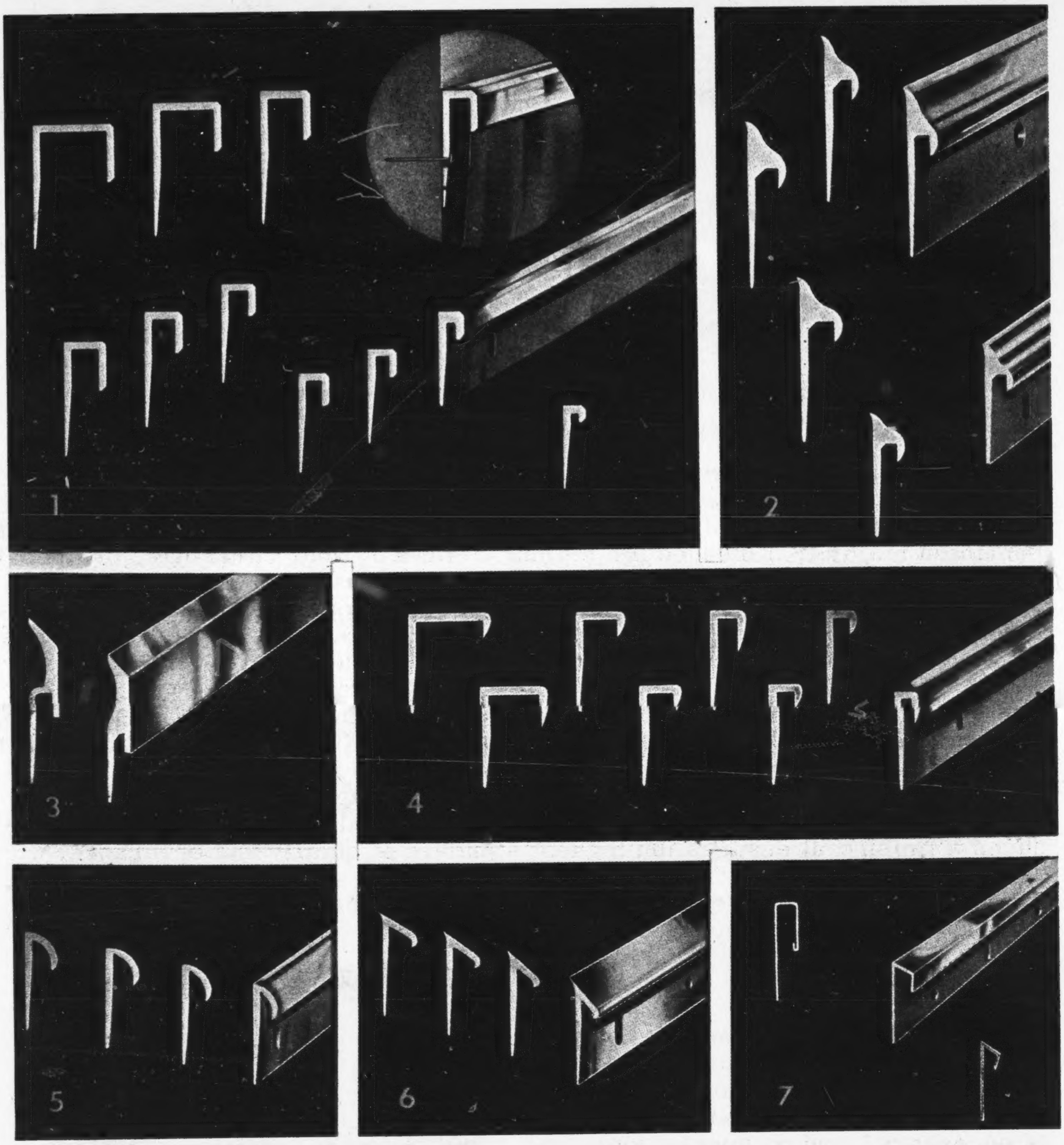


Fig. 2. Various types of cap mouldings

(1) Several sizes of square-topped, tapered, and slotted flanges

(2) A dust-resistant cap moulding with tapered and slotted flanges

(3) A level-faced cap moulding with a wider surface showing, useful in matching other mouldings of the same variety

(4) A series of flat-topped, curved-faced cap strips

(5) Curved-face cap trim with tapered and slotted flange

(6) Dust-resistant cap moulding (a popular cap trim with a sloping outer surface). The tapered flange is slotted and the trim taps down over the covering in place.

(7) A stainless steel slotted-flange cap moulding

Tap-down--(roll-down). Adaptable to linoleum, laminated plastic, and hardboard covering material, tap-down trim is manufactured to simplify installation without the need of close fitting (see Fig. 3).

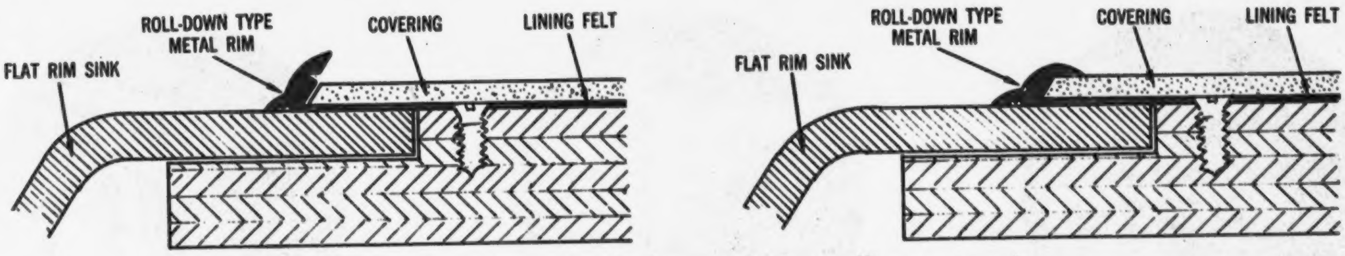

FLAT RIM SINK
ROLL-DOWN TYPE METAL RIM
COVERING
LINING FELT
FLAT RIM SINK
ROLL-DOWN TYPE METAL RIM
COVERING
LINING FELT

Fig. 3. Tap-down rim, before and after rolling or tapping

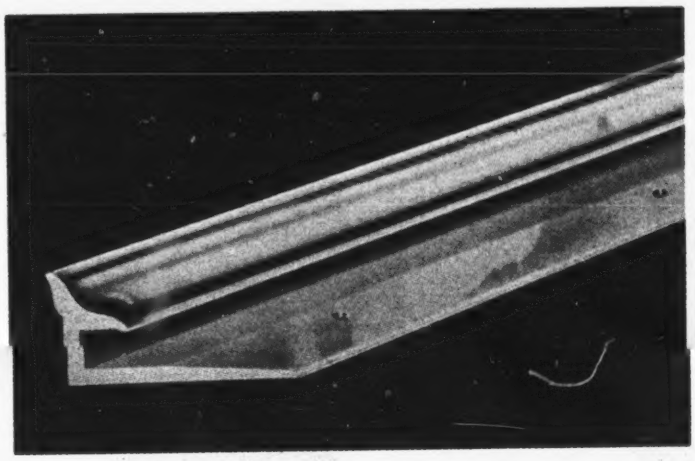


Fig. 4. Concave cove metal

Concave cove metal. Concave cove is a metal trim that is installed after the wall covering material is in place and before installation of the deck covering. It is also used around the tops of tubs.

T-mouldings. T-mouldings are especially designed and suited for shopwork. T-mouldings are installed by cutting a groove into the edge of the plywood top 1/2" deep and slightly narrower than the thickness of the insert tongue. No screws or nails are needed.

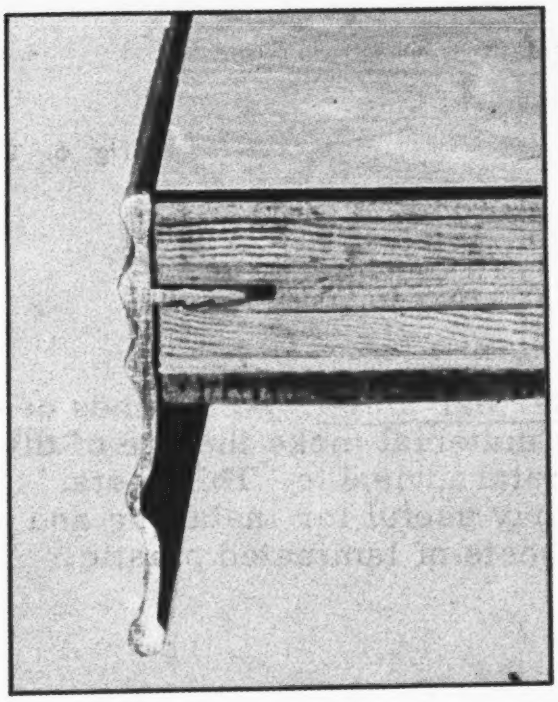
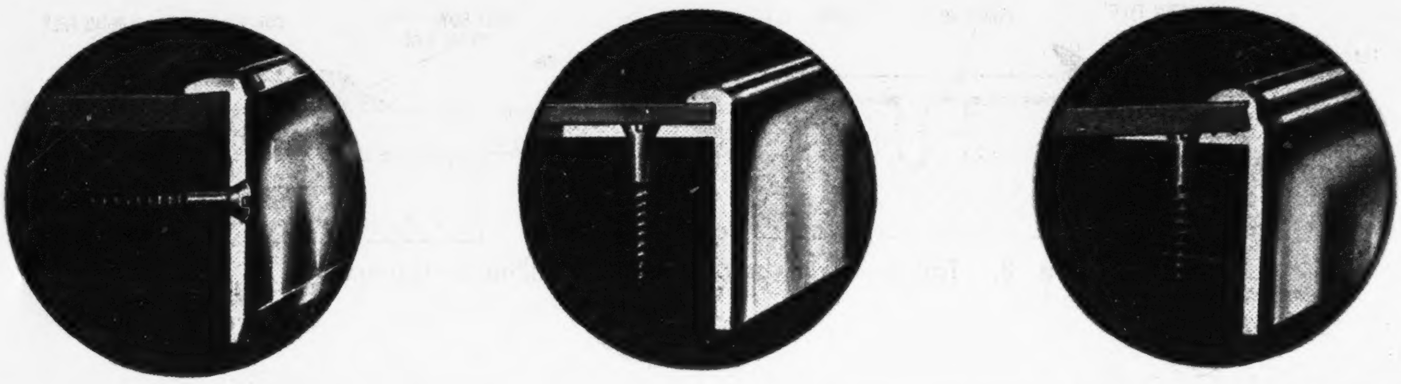


Fig. 5. T-moulding installed

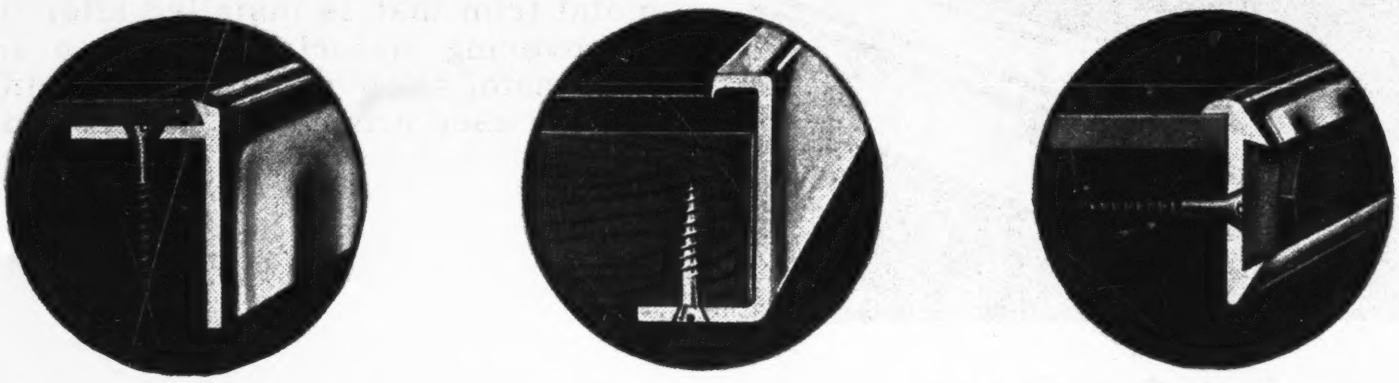
Face metal or counter nosing. Many different types of face metals are available. These come in sizes and shapes to cover the edges of almost all types of sink installations and in varied decorative designs. Of these many variations, the face metals shown in Fig. 6 are sufficient to demonstrate different types of applications.



a. Applied-after nosing with nondrip lip

b. Nondrip, no-scribe nosing with securing flange

c. Tap-down, nondrip nosing with securing flange



d. Scribe-to nosing with securing flange

e. Channel-type nosing

f. Insert nosing with nondrip lip

Fig. 6. Common types of nosings

Divider bar metal. Some kinds of covering material make the use of divider bar metal advisable. This metal is particularly useful for installing and joining sheets of laminated plastic.

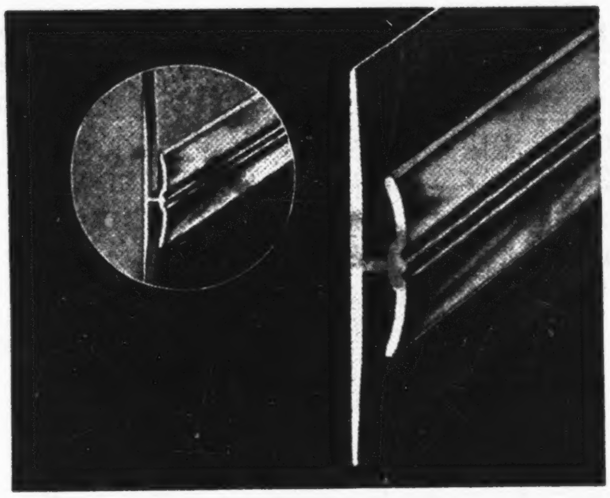


Fig. 7. Divider bar metal

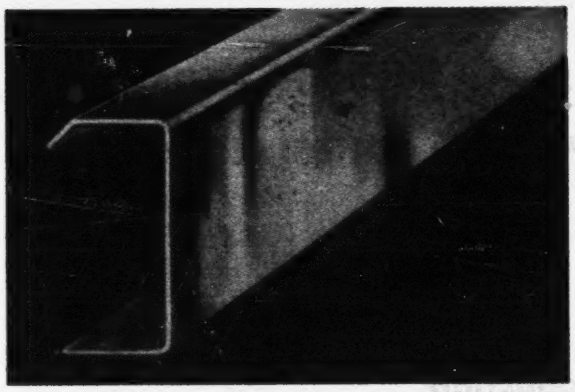


Fig. 8. Snap-on metal

Snap-on metal. Snap-on nosing, made of stainless steel, is difficult to saw and form into corners. No nails or screws are necessary with this trim. Sections are simply fitted into place. Snap-on metal gives a solid ribbon of gleaming stainless steel at its outer edge and along the top. The most popular of this type of moulding has the standard "no-drip angle" at the top, making it ideal for counter top installations.

Linoleum edging. Linoleum edging is recommended for covering the edge of linoleum at doorways and in other unprotected areas. Some edgings are designed for a simple effect and are applied on top of the linoleum. These are quickly and easily installed. Others are designed to fit partially under the linoleum and must be cut to fit.

Cove base fittings. In years past when linoleum mechanics installed cove base or flash cove, they used aluminum alloy mouldings for cove base fittings on the inside and outside corners and the end stops. These flange-like fittings were six inches high. Ease of installation was assured in view of the fact that fittings overlapped, covering the material a full 3/4". This eliminated the need for careful cutting. One-piece cove installation has almost eliminated the use of these mouldings.

Binder bar. A binder bar is an extra-sturdy, versatile moulding of stainless steel laminated on galvanized iron. It is used where a heavy-duty linoleum edging is essential, or where two thicknesses of linoleum must be joined.

Checkup

The average trim is provided with nailing __1__. 1. ________

T-rims have to be __2__ down. 2. ________

Face metal is used on many types of __3__ installations. 3. ________

Nosing of the __4__ - __5__ type takes no screws. 4. ________
5. ________

Divider bar is designed for joining __6__ __7__. 6. ________
7. ________

Linoleum edging is used principally for protecting linoleum at __8__. 8. ________

T-moulding is installed mostly on __9__ jobs, since it 9. ________
requires the plywood be __10__. 10. ________

TOPIC 4— ADHESIVES

Introduction

- Is there any one adhesive that can be used successfully on all floors?
- What specific adhesive problems are found with each common type of floor?
- What are the five basic groups of adhesives?
- What are sealers and when are they used?

An unsatisfactory floor covering installation can result from poor fitting, but other factors can also lead to unsatisfactory installation. For example, a well-fitted installation may have to be completely redone if the wrong adhesive is used--or the right adhesive improperly applied. Perfect bonding is a prerequisite to a satisfactory floor covering installation.

Many adhesives are available in the floor covering trade, some for specific applications, others for use with several materials and floor finishes. Each type of floor presents its own problem to the installer, and he should be familiar with the characteristics of each before attempting to cover it with material.

Related Information

Types of floors. Some types of floors and their problems are:

- On- or below-grade concrete: Hydrostatic pressure is present; that is, water is pushing its way up through the concrete and may cause adhesive problems. The presence of alkalis is also a common problem with this type of floor.
- Suspended concrete: Some moisture may still be present in the concrete or the surface may be dusty and porous.
- Magnesite: The chlorine present in magnesite has been known to cause problems with some adhesives.
- Asphaltic underlayments and lightweight aggregate: Most manufacturers will not guarantee their floor covering over these floors because the surface tends to powder out or separate immediately below the adhesive.
- Wood: Very few problems are present here. However, at least one manufacturer will not guarantee its product over wood particle board, since some poor grades of this board have been known to separate or powder out just below the adhesive level.

- Nonporous surfaces (such as steel, marble, and ceramic tile): It is very difficult to achieve a sufficient bond to these smooth surfaces because there is little chance for an adhesive to get a good "bite."

Types of adhesives. Adhesives may be divided into five basic groups:

1. Water soluble paste. This paste can be dissolved by water after it has dried. Its use is limited to suspended floors, walls, and some countertops. It must be used with linoleum, wall coverings, and certain tiles (other than homogeneous vinyl or asphalt base). Wall coverings require a thin watery paste, linoleum a moderately thick paste, and tiles a thick, tacky paste.

2. Asphalt base adhesives. Asphalt adhesives are used for the installation of asphalt or vinyl-asbestos tiles. They are usually black.

    a. Asphalt emulsion: Asphalt emulsion, which can be mixed with water, can be used successfully on on-grade and above-grade floors. Once it has dried on the material or walls, steel wool or cleaning solvents are required to remove it.

    b. Cutback adhesive: Used on below-grade or on-grade concrete floors, a cutback adhesive cannot be mixed with water, and steel wool or cleaning solvent must be used to remove it when dried.

    c. Brushing adhesive: Mostly a "do it yourself" item, but also used by installers, brushing adhesive is used on all types of floors. Steel wool or cleaning solvent must be used to remove dried spots.

3. Waterproof adhesives.

    a. Alcohol-resin base: The color of alcohol-resin base adhesive may run from almost white to black. It is not truly waterproof, but it is highly water resistant. It is used for the installation of rubber, homogeneous vinyl, cork, and linoleum tiles with on-grade or above-grade floors, for rubber cove base, and for many types of counter tops. A cleaning solvent is required to remove any dried spots.

    b. Rubber-water emulsion adhesives: Cream to grey in color, these adhesives are more nearly waterproof than the alcohol-resin base type. A cleaning solvent is required to remove dried spots. These adhesives are used to perform the same type of job as the alcohol-resin adhesives.

    One manufacturer makes two excellent rubber-water adhesives. One performs the same job as the alcohol base, plus bonding asbestos backed vinyl sheet goods to below-, on-, and above-grade wood or concrete floors. The other product does all this, plus drying very fast, which is valuable in case the floor indicates the possibility of a particularly rapid transmission of water.

4. **Two-stage on- and below-grade concrete adhesives.**

   a. **Chemical-setting cements: These consist of liquid latex and powdered aggregate, mixed as they are used. This type of cement has been used successfully to install nonporous materials such as rubber or homogeneous vinyl tiles on both on-grade and above-grade concrete floors.**

   b. **Epoxy cements: These cements are mixed as they are used. Their chief use is for bonding homogeneous vinyl and rubber tiles to all concrete floors.**

5. **Specialty adhesives.**

   a. **Contact bond cement: A cement for use in bonding materials to small areas of nonporous or very porous surfaces and to round surfaces such as step and counter edges.**

   b. **Cove base cements: These may be any of several adhesives developed specifically for installation of top set cove base. Usually they are characterized by high initial tack or "grab."**

   c. **Pressure-sensitive film: Manufactured in a continuous length and up to 54" wide, this film is reinforced internally by a resin-treated, open-weave rope paper and is wound on a release paper. For application, the film is placed on the floor, paper up, and rolled with a heavy roller. The paper is then peeled off, the tile laid on the film, and the whole assembly rolled.**

Sealers. Sealers are made for use on both floors and walls. They are used before the paste or cement required for installation. Sealers are used on concrete floors to seal dusty or porous surfaces or to act as a moisture barrier. On walls, sealers are used to size dusty or porous surfaces that tend to absorb and dry out a paste or cement very rapidly. Asphalt primer is one example of this type of material.

Checkup

Adhesives are divided into two basic groups.	**1.**	**T**	**F**
Water soluble paste is used on below-grade concrete floors.	**2.**	**T**	**F**
Asphalt-type adhesives are used for cementing homogeneous vinyl tiles.	**3.**	**T**	**F**
Chemical-set adhesives are mixed on the job.	**4.**	**T**	**F**
Cutback adhesives are mixed with water.	**5.**	**T**	**F**
Alcohol base adhesive bonds asbestos-backed vinyl sheet goods to below grade concrete subfloors.	**6.**	**T**	**F**

Water soluble paste is used to bond rubber base to a surface. **7. T F**

Epoxy adhesives are mixed on the job. **8. T F**

Sealers are used on walls as a moisture barrier. **9. T F**

Hydrostatic pressure is present in wood subfloors. **10. T F**

A dry or dusty wall surface may require a sealer. **11. T F**

TOPIC 5– UNDERLAYMENTS

Assignment

Installation Manual, Armstrong Cork Company, pp. 29-32, 186-7.

Introduction

- Why is an underlayment sometimes necessary in floor covering?
- What are the two main types of underlayments?
- What is the most commonly used underlayment in the trade?
- When is a mastic underlayment permissible?

Many times existing floor surfaces are not suited for the direct application of resilient floor covering. As a result of various conditions, the installer is often required to apply one of several types of underlayment.

Related Information

Plywood. The most commonly used underlayment material is plywood. For this purpose a good grade of 1/4" plywood with no voids in the center ply is recommended. Plywood is available in 4' X 8' sheets.

Masonite. Masonite is also known by several other familiar names--Temboard, hardboard, and fiberboard, to name a few. The product is a highly compressed wood fiber composition and is probably the most satisfactory underlayment material for most uses. Although available in several thicknesses, 1/4" is the most widely used for this purpose. For convenience in hauling and handling, masonite is manufactured in 3' X 4' and 4' X 4' sheets as well as the standard 4' X 8'.

Particle board. Many manufacturers make particle board. These products vary widely with respect to their performance under resilient flooring. Some particle boards are suitable as underlayments, but not all resilient flooring manufacturers guarantee their products over such material. Its performance characteristics are unknown and varying.

Installers should be careful in making any commitments or accepting responsibility where particle board has been installed as an underlayment, because performance is uncertain.

Felt. The underlayment products previously mentioned are secured to the subfloor by nailing or stapling, and such underlayments are required when the condition of the existing floor is quite bad. There are occasions, however, when only relatively minor correction is necessary. This can be accomplished by installing lining felt, saturated or semisaturated, depending upon the type of wood floor involved and the floor covering being installed.

Mastic underlayments. Mastic underlayments are used where irregularities are not so severe as to require board, and where monolithic floors (such as concrete) have a slightly irregular surface.

Checkup

The plywood most commonly used as an underlayment is 1/4" thick. 1. T F

Voids in the center ply of plywood are not important because they can be filled with patching plaster. 2. T F

Temboard is a brand name for the same material as masonite. 3. T F

Masonite is manufactured only in 4' × 8' sheets. 4. T F

Some resilient floor covering manufacturers refuse to guarantee an installation of their products over particle board underlayments. 5. T F

Lining felt is a satisfactory underlayment for floors with minor imperfections. 6. T F

Single applications of mastic underlayments containing latex binders should not exceed 1/8". 7. T F

Mastic underlayments with asphalt binders should be applied in coats of at least 1/2". 8. T F

Board underlayments may be used to resurface all types of subfloors. 9. T F

Patching plaster is recommended as an underlayment provided the edges can be properly feathered. 10. T F

TOPIC 6— TOOLS AND EQUIPMENT

Assignment Installation Manual, Armstrong Cork Co., Chap. 1.

Introduction

- What basic tools are commonly used in the floor covering trade?
- What special tools are used by a floor covering installer?
- What power tools are commonly used in the floor covering trade?
- Why are so many special-purpose tools required in the installation of resilient floor covering?

It is not uncommon to hear an old-timer in the trade refer to the days when "all we had for tools was a knife, a hammer, and a stick with a nail in it for a scribe bar." The workman of today, however, uses a wide variety of tools, including many special tools, to install modern floor covering. The introduction of many new materials, special-purpose adhesives, and improved techniques made possible an ever-growing variety of jobs, but with this came the need for special tools.

The floor covering industry has kept pace with this need and the knowledgeable mechanic is familiar with each of these tools and its proper use, thereby enabling him to perform his work better, faster, and with a minimum of expense.

Related Information

Basic Hand Tools

The following basic hand tools, used by craftsmen in many fields, are also used by the floor covering installer:

Wood and metal chisels
Wood and metal saws
Files
Tin snips
Drilling tools
Awls
Chalk lines
Plumb blobs
Screwdrivers
Crescent wrenches
Pipe wrenches
Nail sets

Steel tapes
Levels
Steel squares
Counter brushes
Hammers
Pliers
Putty knives
Long-haired paint rollers

Special Hand Tools

Special hand tools used by the floor covering installer include the following:

- Fastening tools

1. Spot nailers are used to fasten 1/4" plywood, hardboard, or particle board underlayments with a 7/8" staple, and similar 1/2" underlayments with a 1-1/8" staple. The staples are driven by striking the plunger with a rubber mallet.

2. Power nailers are also activated by striking the plunger with a mallet, and are especially useful for securing 1/2" underlayments with 1-1/4" staples.

3. Hammer staplers that drive small staples (usually from 3/8" to 9/16") are used for securing thin materials, such as padding.

4. Brad pushers are used for driving brads in hard-to-reach places. The magnetic point drives and countersinks the brad in one operation. There are many models of brad pushers on the market, but they are all of basically the same design and operation, with differences mainly in size.

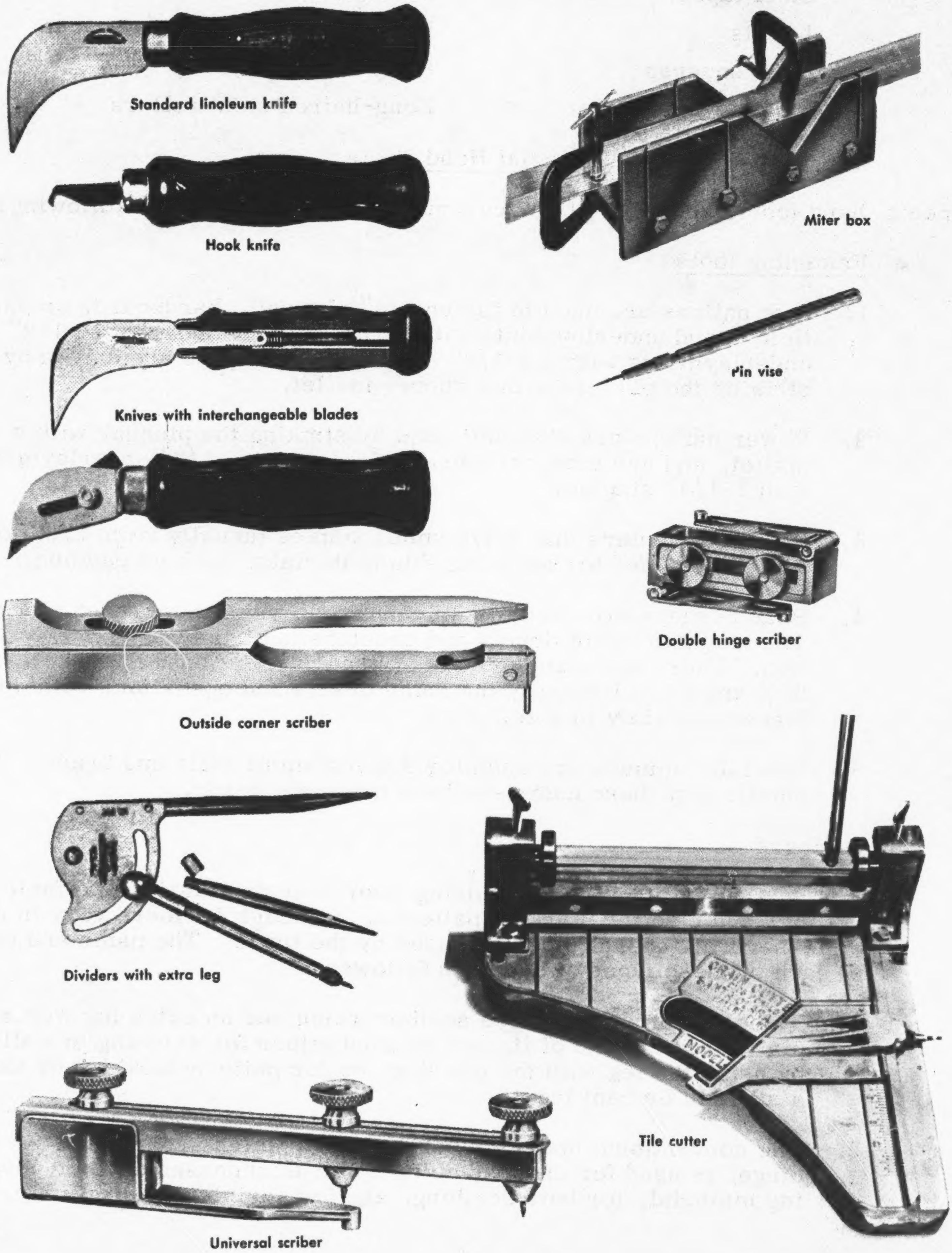
5. Special hammers are used for driving small nails and brads. The smallest of these hammers have magnetic heads.

- Scribers

The scriber is a device for scoring floor covering material to facilitate cutting, and also for marking patterns. Although scribers vary in design, several general types are used by the trade. The name and uses of each of these types of scribers follows:

1. The common divider-type scriber which has an extra leg with a pin vise in the end of it, can be used either for scribing to walls by using the leg with the pin vise, or for pattern-scribing by using a straight or bent leg.

2. The conventional underscriber, some of which are hinged with one hinge, is used for underscribing on all thicknesses of floor covering material, for butt-scribing, and for scribing feature strip.



Standard linoleum knife

Hook knife

Knives with interchangeable blades

Outside corner scriber

Dividers with extra leg

Universal scriber

Miter box

Pin vise

Double hinge scriber

Tile cutter

Courtesy Pacific Floor Products

Fig. 9. Cutting and marking tools

3. The double hinged scriber is similar to the conventional underscriber except that it has two hinges and allows for two settings--one for heavy gauge linoleum and certain vinyls, the other for standard weight inlaid linoleum.

4. The bar scriber has helped to eliminate much freehand guesswork. It can be used for scribing against porcelain and tile, for inside corners, and for cap strip. Bar scribers are available in several sizes. For big jobs, two common sizes are used: 7" extending to 13-1/2", and 14" extending to 28".

5. Outside corner scribers are used for marking sheet goods and resilient tile along certain corners and edges as well as along outside cove corners.

6. A pin vise consists of a chuck that can be adjusted to hold replaceable needles. In some models, the required pins are stored in the handles. A pin vise is used to cold-cut tile or for simple scribing of material.

- Cutting tools

1. Various types of knives are used in the floor covering trade.

   ... A regular linoleum knife is standard equipment. This is a fixed-blade knife with a two- to three-inch blade and either a deep or shallow hook.

   ... A hook knife is used for cutting felt-base goods. The blade is designed to cut along a scribe line.

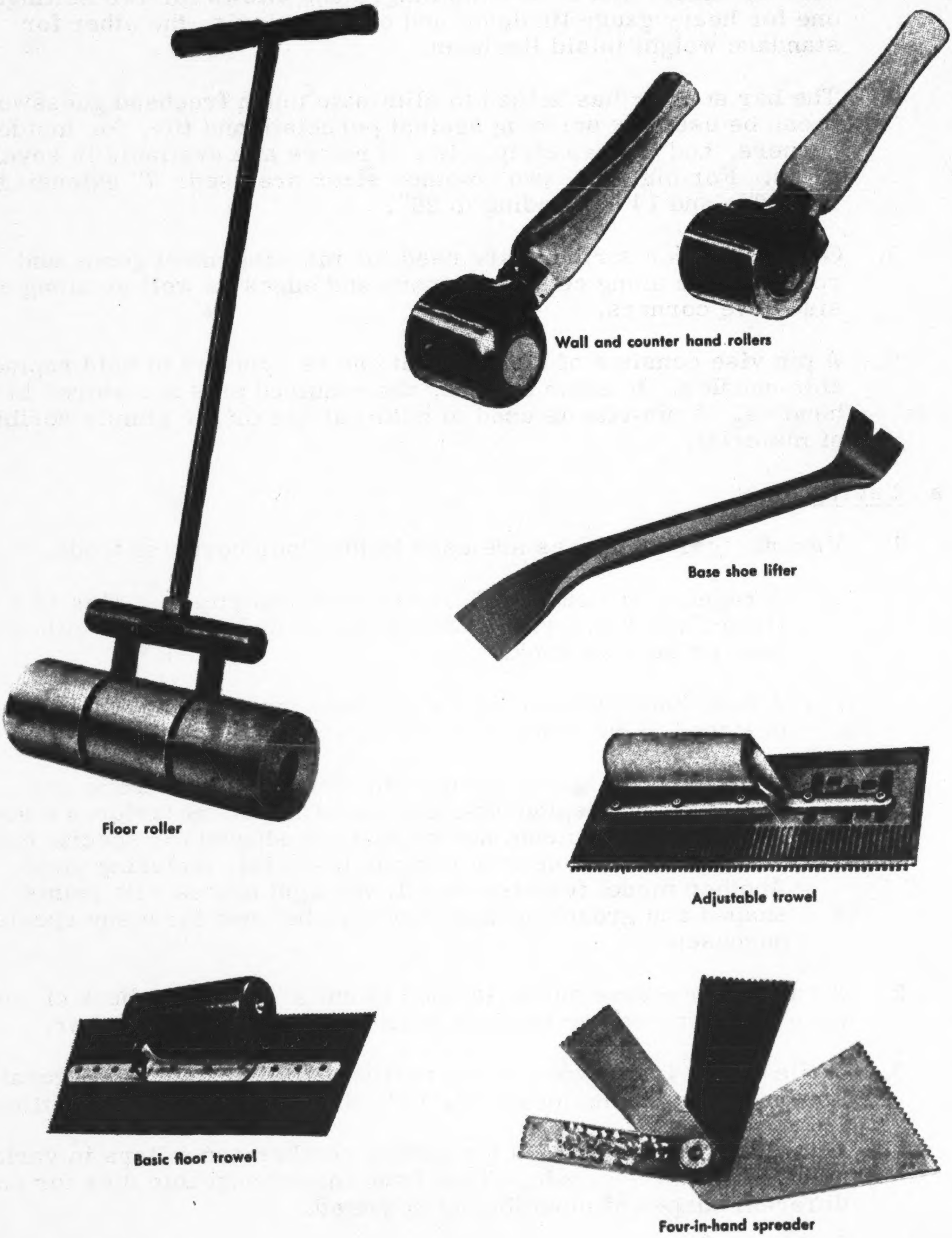
   ... Certain of the knives used in the floor covering trade are equipped with replaceable blades. One model features blades like those in linoleum knives that are shaped for special types of work and for use with various material, including vinyl. Another model features small, straight blades with points shaped and ground so that they may be used for many special purposes.

2. A rubber cove base cutter is used to cut a "V" on the back of rubber cove base, for easier bending to an inside or outside corner.

3. A tile cutter is designed to cut resilient tile straight or diagonally. Most models accommodate 9", 12", or 18" asphalt or vinyl tiles.

4. Metalmiters are designed for cutting notches and miters in various metals used in the trade. They have interchangeable dies for cutting different shapes of moulding as required.

5. Miter boxes, are used in cutting wood and metal mouldings or trims.



Floor roller

Wall and counter hand rollers

Base shoe lifter

Adjustable trowel

Basic floor trowel

Four-in-hand spreader

Courtesy Pacific Floor Products

Fig. 10. Some special tools of the trade

- Miscellaneous tools

1. Straightedges in lengths from 18" to 75" are indispensible to the floor covering trade. They are available in both rigid and flexible blue steel.

2. Rubber base straightedges are used for squaring the ends of top set base. Two sizes are available for use with 4" and 6" base.

3. Base shoe lifters, also known as base moulding lifters, are used for removing baseshoe and baseboard, and doing various light prying jobs.

4. Floor scrapers, from 1" to 14" wide, are used to remove old floor coverings and to scrape wood and concrete floors as required for new installations.

5. Cap supporters are used to hold heavy cap metal in place prior to securing it to the wall.

6. Rollers of various sizes and weights are used to remove small air pockets from under sheet goods and resilient tile. Rollers weighing from 150 lbs. are designed for general floor use; smaller, lighter rollers are designed for wall, cabinet, counter, and rubber base work.

7. Relative humidity meters are often used to measure the amount of moisture present in a concrete floor. Placed under a transparent, airtight cover, the meter indicates when too much moisture is present for proper adhesion.

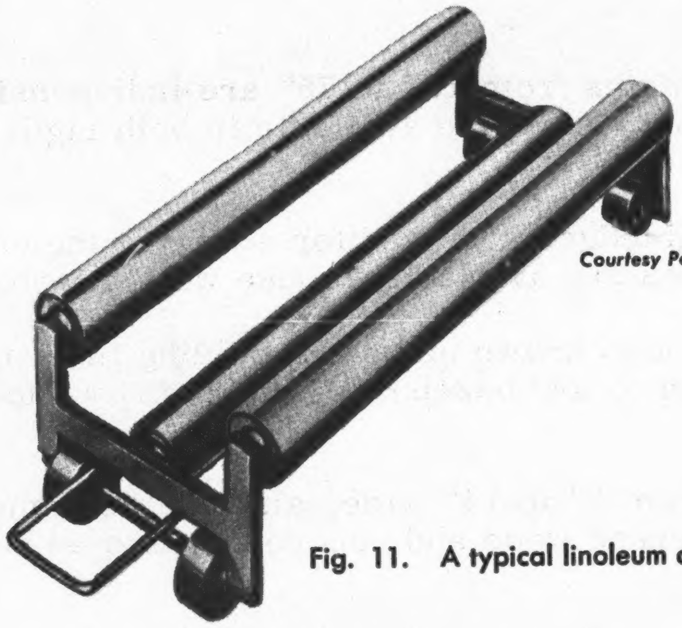
8. Trowels and spreaders of many sizes and shapes are used extensively in the trade. Those designed to apply paste or cement have serrated edges.

9. Margin trowels are used for smoothing asphalt tile after it has been heated, cut, and set into place. These trowels are sometimes referred to as spatulas.

10. Butane torches are used for heating sheet goods and resilient tile to make bending, forming, and cutting easy.

11. Hand trucks and dollies are used for moving and unrolling sheet goods and for transporting other heavy objects such as boxes of tile.

12. Skat skates are used under appliances and heavy furniture for moving them to and from the area of installation. The installer must be careful not to use too much adhesive under the floor covering, or the wheels of the loaded skat skates will leave an impression when rolled across the floor.



Courtesy Pacific Floor Products

Fig. 11. A typical linoleum dolly

13. Tile scooters are convenient to use when laying resilient tile. Stacks of tile can be placed on the scooter which is rolled along with the installer as he works. Most installers make their own scooters.

Power Tools

- Electric floor sanders are usually in one of two types: one a drum sander with 8" wide sandpaper for general field work, and another, an edger-sander, with a 7" disk, mostly for small areas that cannot be reached with the larger sander and for areas close to walls and other vertical objects.
- Buffers are used for polishing floors and, with the proper attachments, for grinding and cleaning concrete in preparation for the installation of floor covering.
- Electric drills, with 1/4" and 3/8" chucks, have many uses on the job.
- Portable electric circular saws are used mostly for counter work, but they are convenient for many small cutting jobs.
- Electric saber saws are used primarily for making cutouts in counter tops for sink installations and the like.

Checkup

Skat skates are used to remove heavy objects from the area of installation.	1.	T	F
The buffer removes old plywood or hardboard underlayments.	2.	T	F

The use of staplers is a fast way to secure plywood or hardboard underlayments. 3. T F

One inch staples are used for securing 1/2" underlayments. 4. T F

One of the uses of dividers is for pattern scribing. 5. T F

Bar scribers can be used to mark resilient floor coverings to fit most vertical obstructions. 6. T F

Bar scribers can be extended to 38". 7. T F

Double hinge underscribers are used for marking seams in resilient floor covering. 8. T F

Outside corner scribers are used for marking circles. 9. T F

Floor rollers are used for smoothing out small cuts in the material and minor protrusions showing through a newly installed floor covering. 10. T F

Butane torches are used for heating floor coverings so they can be bent easily. 11. T F

Tile cutters are designed to cut on a curved line. 12. T F

Using the tile scooter is an easy way to carry tile up or down a stairs. 13. T F unit C

BLUEPRINT READING AND ESTIMATING

The ability to read and interpret blueprints is an essential part of a craftsman's art. The blueprint serves as a form of communication between the architect or designer and the men who will do the work. Like all forms of communication, blueprints use a particular language which is easily and accurately translated by those familiar with that language.

The floor covering installer is concerned only with those portions of a print that tell him what he must know to perform his work. He will be aided further by special detail drawings and, very often, specification sheets, all of which, taken together, should give him a complete picture of what material is to be used, how it is to be installed, and how it should look when the job is completed.

In some areas, the installer--if in charge of a job--is held responsible to see that specifications, schedules, and codes are followed. In other areas this is the responsibility of the shop foreman or the owner. However, in all cases, the installer must have the ability to read and interpret blueprints.

This unit explains how blueprints are used in the trade, what the installer should know about specifications, schedules, and codes, and the importance of floor plans and details.

TOPIC 1— SPECIFICATIONS, SCHEDULES, AND CODES

Introduction

- How does the floor covering installer use specifications?
- Where does the installer find floor finish information on large plan sets?
- When does the installer need to be concerned with building codes or FHA requirements?

In order to determine the specifications regarding floor covering for a particular job, the installer may have to examine several sources. These may include a room finish schedule on the plans, notes included on floor plans or details, a floor finish schedule, or the specifications that accompany any large set of plans. To save time in finding such information, the installer needs to know where to look first for each type of job--residential or commercial, large or small.

Related Information

Residential plans. On residential jobs it is usual for the specifications regarding floor covering to be included in the room finish schedule on the working drawings. Even on the room finish schedule, however, they may not be in sufficient detail. In this case, detail can usually be found noted on the floor plans or interior elevations. Sometimes the only provision in the specifications, if they exist, is for a certain dollar amount to be spent on floor covering.

Large plan sets. On larger jobs, specifications include a section on floor covering. Generally this is not extremely detailed, but merely lists a standard type of covering and then adds "or equivalent." Occasionally complete information is included, which must then be followed in detail. On large jobs, therefore, it is important to check specifications first. If any changes have been made in the original specifications, they are included in "addenda" attached to the back of the specifications. If such an addendum exists, it is wise to check this first, then the specifications, and then the working drawings.

Plans of larger jobs may also include a separate floor finish schedule which indicates the type of finish for the floor in each room. A typical schedule is reproduced in Fig. 12.

Underlayments. In addition to floor or wall covering specifications, it is also necessary to check the specifications for the type of underlayment to be used. Although the underlayment is normally installed by other tradesmen, the floor covering installer should determine whether the plans and specifications have been followed and report his findings to his employer if they have not been followed, for should he install the floor covering over an improper underlayment, his employer may be held responsible for replacing the floor covering if the underlayment fails.

FLOOR FINISH SCHEDULE

ROOM	LINOLEUM	ASPHALT TILE	CORK	PAINT	CARPET
101				●	
102	●				
103	●				
104	●				
105			●		
106			●		
107					●
108		●			
109	●				
110	●				

Fig. 12. Typical floor schedule

Building codes and FHA requirements. The floor covering installer is usually not concerned with building codes. Two important exceptions to this are bathrooms in multiple dwellings and conductive floors in certain hospital or other areas where explosion hazards exist. Local building codes usually require that certain materials and construction be used in such locations, and the installer should be familiar with code requirements pertaining to such jobs.

The Federal Housing Administration (FHA) guarantees the loans made by banks or other lending agencies on a large proportion of construction. When the FHA guarantees a loan, it also requires that certain minimum construction requirements be observed. The specific requirements vary in different localities. In regard to floor covering, they are very general, usually specifying certain minimum thicknesses of "standard" grades of material, and specific grades required for certain purposes. The installer should be familiar with the requirements in the locality in which he works.

In general, of course, the architect must draw up his specifications in accordance with local building codes and FHA requirements where they apply. However, it is wise for the installer also to be aware of the requirements so that he can call attention to any inconsistencies he may find between the specifications and local regulations.

Checkup

The details of floor covering for a residential installation are most likely to be found in the specifications. 1. T F

Floor covering specifications can be drawn up by the architect without regard to codes or requirements. **2. T F**

Changes in original specifications are referred to as "addenda." **3. T F**

Most floor covering specifications for larger jobs are very specific. **4. T F**

A floor covering contractor frequently does not even have a copy of the specifications for a residential job. **5. T F**

Greatest detail regarding floor covering for a residential job is often found on the plans or elevations. **6. T F**

FHA requirements, when they apply, may be substituted for local building codes. **7. T F**

Local building codes frequently contain requirements regarding bathrooms in multiple dwellings. **8. T F**

Specifications for underlayments are of little interest to the floor covering installer. **9. T F**

Building codes usually control the installation of conductive materials. **10. T F**

TOPIC 2— FLOOR PLANS AND DETAILS

Introduction

- When is there a need to check the drawings?
- What does the installer look for on floor plans?
- How does the installer know what details to inspect in order to learn what he needs to know?

In the floor covering trade, most of the work with blueprints is done by the person who estimates and bids the jobs. By the time the installer arrives on the job with his materials, the structure is completed (or nearly so) and the fixtures, cabinets, and such items are in place. However, it is important that an installer know how to check the drawings for special information. Any building tradesman should be capable of checking plans, schedules, and details relating to his craft and interpret such information accurately.

Included with this book is a set of drawings of a typical, modern, custom-built home. In the checkup section at the end of this topic there are questions concerning these drawings. To find the answers to these questions, the apprentice will need to study the plans in detail until he understands them thoroughly.

Related Information

Floor plans. When the installer goes on a job, he has a work order which indicates the materials to be installed in certain designated areas. However, if the job is large, he may need to check the plans to determine the material that goes in each room. The floor plans will locate each room for him. He should also check the dimensions of each room to be sure he has sufficient material on hand.

The dimensions appearing on floor plans are measured from the outside stud line (in the case of outside walls) to the center of the partitions. These dimensions are obviously not appropriate for the floor covering man, since he is working entirely within the inside perimeter of the rooms. Therefore, if he wants to use the plans to check room measurements, he must scale them himself. The scale of most plans is 1/4 inch to the foot. More probably, however, he will simply tape a room to determine its dimensions.

Elevations. The floor covering installer has little, if any, need to check exterior elevations, since all his materials are installed inside. However, elevation drawings are also made of parts of the interior of a building--cabinets

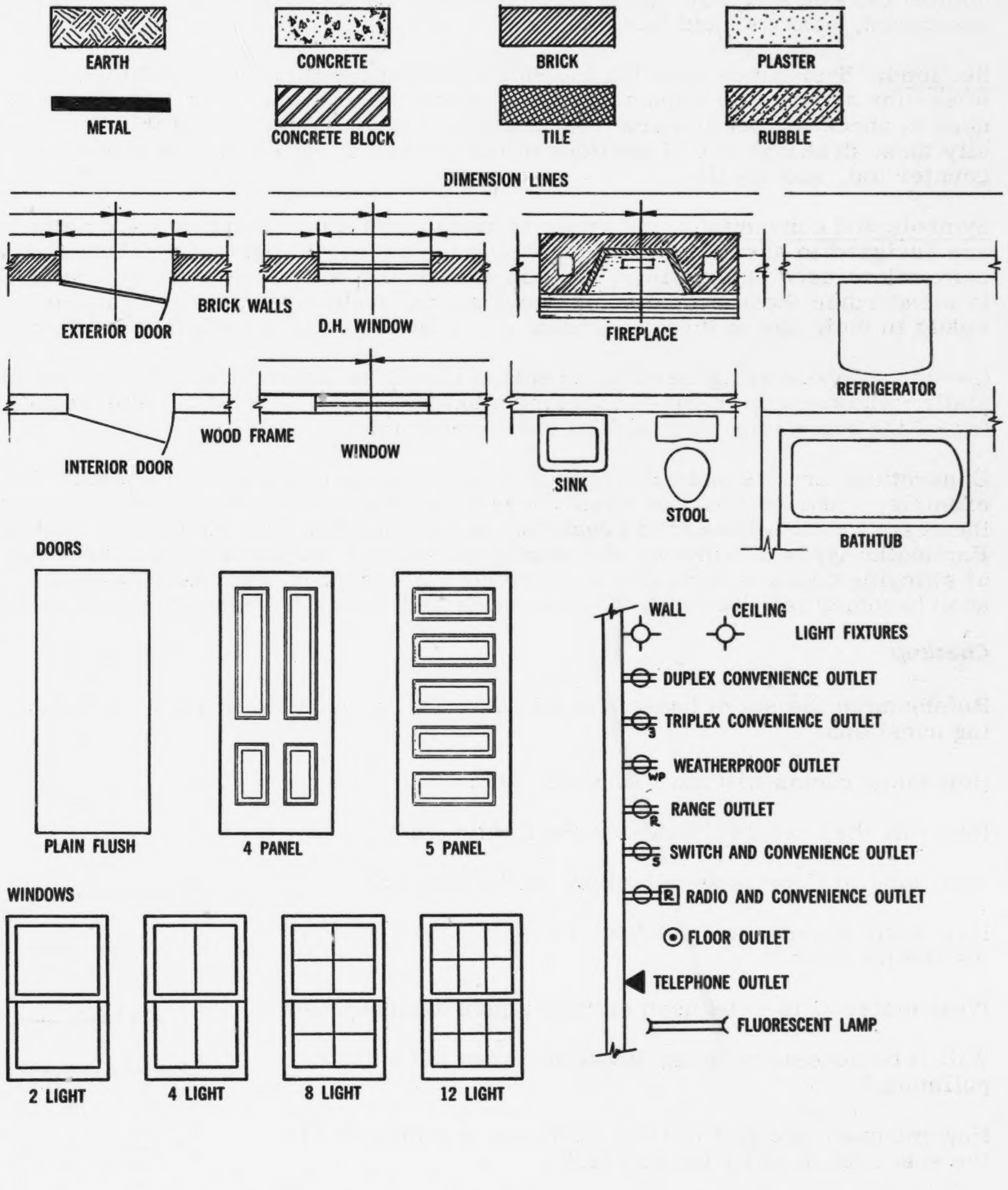

EARTH
CONCRETE
BRICK
PLASTER
METAL
CONCRETE BLOCK
TILE
RUBBLE
DIMENSION LINES
BRICK WALLS
EXTERIOR DOOR
D.H. WINDOW
FIREPLACE
REFRIGERATOR
WOOD FRAME
WINDOW
INTERIOR DOOR
SINK
STOOL
BATHTUB
DOORS
PLAIN FLUSH
4 PANEL
5 PANEL
WALL
CEILING
LIGHT FIXTURES
DUPLEX CONVENIENCE OUTLET
TRIPLEX CONVENIENCE OUTLET
WEATHERPROOF OUTLET
RANGE OUTLET
SWITCH AND CONVENIENCE OUTLET
RADIO AND CONVENIENCE OUTLET
FLOOR OUTLET
TELEPHONE OUTLET
FLUORESCENT LAMP
WINDOWS
2 LIGHT
4 LIGHT
8 LIGHT
12 LIGHT

Fig. 13. Some commonly used symbols and conventions

in particular, or other vertical surfaces. The installer may want to check the cabinet drawings for toe-space treatment and for all kinds of trim, such as baseboard, casings, and thresholds.

Sections. Sometimes even the interior elevations will not give sufficient information about some important aspect of the installation. The installer may need to check the section drawings that apply to the particular problem. Usually these drawings are of sections of cabinets that detail the toe space, the counter top, and the like.

Symbols and conventions. In order to understand what floor plans and details are designed to show, the installer needs to understand certain symbols and conventions used on drawings. Although attempts have been made by architects to standardize these symbols and conventions, architects remain highly individual in their use of them. Unusual symbols are usually explained on the plans.

Certain symbols are generally accepted and will be referred to often by the installer who makes a habit of checking plans and details. Fig. 13 illustrates a few of the more important symbols and conventions.

Conventions are a standard means of drawing certain features on a plan. For example, when only part of a feature is illustrated and the reader must imagine the rest, a conventionalized break line is used to show that the feature continues. Particular types of windows are usually drawn in a certain way, the direction of swinging doors is indicated in a certain way--anyone who reads drawings soon becomes familiar with these methods and learns to recognize them instantly.

Checkup

Referring to the set of house plans in the back of the book, answer the following questions:

How many rooms will have linoleum floors? 1. ____________

How will the base be finished in the family room? 2. ____________

What kind of floor is specified for the bedrooms? 3. ____________

How many square yards of floor covering will be laid in the family room? 4. ____________

What material is to be used on the kitchen drainboards? 5. ____________

Will it be necessary to lay linoleum under the bathroom pullmans? 6. ____________

How many square feet of floor covering is eliminated in the space taken up by the bathtub? 7. ____________

How many square yards of linoleum are required for the shower bath if a 4-inch cove is used? 8. ____________

What is the total number of feet of cove required for the kitchen and dining areas? 9. __________

Is it necessary to install floor covering in the area marked "refrigerator space"? 10. __________

unit D

SURFACE PREPARATION

Preparing a floor surface for the installation of a resilient floor covering is one of the most disagreeable jobs in the floor covering trade. However, it is of great importance because correcting or repairing floor defects after a floor covering is installed is next to impossible. For this reason, an installer must be able to prepare all types of floors for the application of floor covering.

The method of floor preparation to be used is determined by the type of material of which the floor is made. In general, two main types are recognized: (1) masonry surfaces and (2) wood or other surfaces. A thorough understanding of the methods employed in surface preparation of either of these types of floors is essential if a successful job of floor covering is to be achieved.

TOPIC 1— MASONRY SURFACES

Assignment Installation Manual, Armstrong Cork Co., Chaps. 2, 3, 4, and 5.

Introduction

- What is meant by "grade level" and of what importance is it to floor covering?
- What is the purpose of a moisture test on a concrete floor, and how is it accomplished?
- How are fillers used to prepare a floor?
- What is the best method of priming a concrete floor?

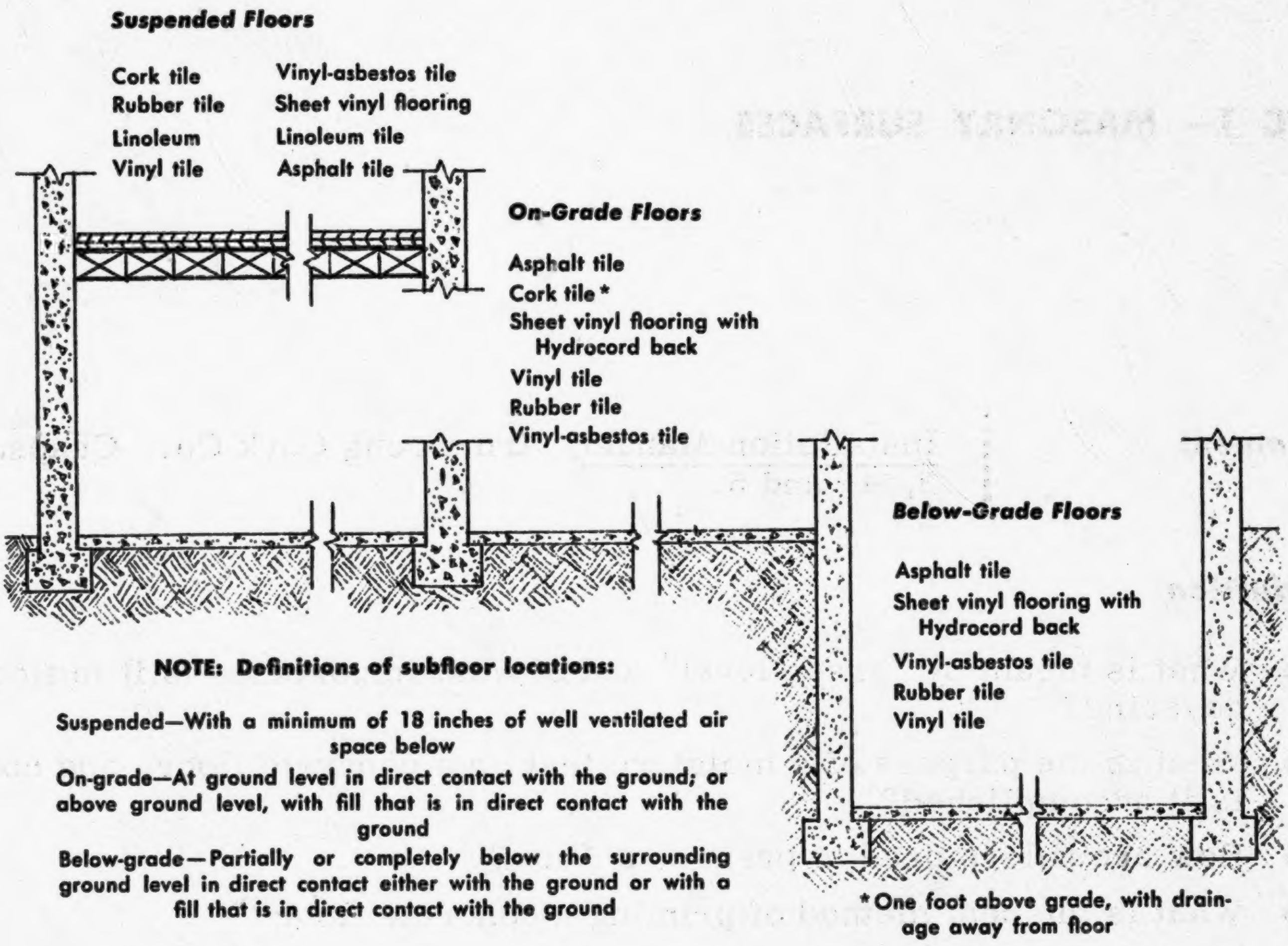
The life of a resilient floor covering, as well as its appearance, depends in large part upon the condition of the floor upon which it is laid. In the case of new concrete floors, they must be thoroughly dry, clean, and cured to a hard finish. Any dampness or powdery surface condition will prevent proper bonding of the adhesive. All imperfections must be corrected--low spots filled in and high spots smoothed out. It is especially important in the case of old concrete floors to look for and repair cracks, holes, or breaks in the surface. The surface must be free from oils, varnish, paint, dirt, or any other foreign substance.

Related Information

Grade Level

The proper preparation of a concrete floor depends to a large extent on its location in relation to grade. "Grade" refers to the level of the ground adjacent to the floor (see Fig. 14). Thus, if the floor is a concrete slab poured on the ground and level with it on all sides, it is an on-grade floor. If any part of the floor is lower than the surrounding ground, the floor is considered to be below-grade. If a floor is above the ground level, it is called above-grade, or suspended. All properly constructed wood floors, as well as many concrete floors, are above-grade floors.

Concrete floors in direct contact with the ground (on-grade and below-grade), as well as suspended concrete floors that lack adequate ventilation underneath.


Suspended Floors
Cork tile
Rubber tile
Linoleum
Vinyl tile
Vinyl-asbestos tile
Sheet vinyl flooring
Linoleum tile
Asphalt tile
On-Grade Floors
Asphalt tile
Cork tile*
Sheet vinyl flooring with Hydrocord back
Vinyl tile
Rubber tile
Vinyl-asbestos tile
Below-Grade Floors
Asphalt tile
Sheet vinyl flooring with Hydrocord back
Vinyl-asbestos tile
Rubber tile
Vinyl tile

NOTE: Definitions of subfloor locations:

Suspended—With a minimum of 18 inches of well ventilated air space below

On-grade—At ground level in direct contact with the ground; or above ground level, with fill that is in direct contact with the ground

Below-grade—Partially or completely below the surrounding ground level in direct contact either with the ground or with a fill that is in direct contact with the ground

*One foot above grade, with drainage away from floor

Fig. 14. Kinds of resilient floor covering which may be installed on various types of subfloors

are always damp to some degree. In addition, all new concrete floors retain a certain amount of moisture for a long period of time. All such floors must be tested for moisture content before a floor covering can be installed.

Moisture Tests

Although several different tests may be used to determine moisture content in concrete floors, the two easiest and most commonly used are the mat moisture test and the primer test.

Mat moisture test. The mat moisture test may be used to check all types of floors for proper bonding of adhesive, and to detect an abnormal amount of moisture. This test should be used before the installation of rubber tile, vinyl tile, cork, or sheet vinyl with an asbestos-fiber back.

The procedure for carrying out this test is given in the assigned reference. (The apprentice should understand, however, that any water-soluble or waterproof cement may be used instead of the specific brand given in the reference.) This test will indicate that an abnormal amount of moisture is present in the concrete if, at the end of the 72-hour testing period, the water-soluble cement is partly or completely dissolved or the waterproof cement has turned yellow.

If the mat moisture test has been repeated twice and moisture still exists, none of the resilient coverings referred to should be installed. Asphalt or vinyl-asbestos tile may be substituted, but a primer test should still be made.

Primer test for moisture. Details on conducting a primer test for moisture are given in the reference assignment. (As with the mat moisture test, the apprentice should realize that a number of primers on the market are satisfactory for conducting this test. The procedure is basically the same with all of them.)

General Preparation

In the general preparation of any floor to be covered with resilient covering, the removal of all foreign matter is of prime importance. Anything that will mar the finished floor or that could cause an adhesive failure must be completely removed from the surface to be covered. On some floors, scraping and sweeping may be adequate; on extremely dirty floors, sanding may be necessary. If a concrete floor has been exposed to grease or oil, the floor may need to be scrubbed with a 10 percent solution of muriatic acid.

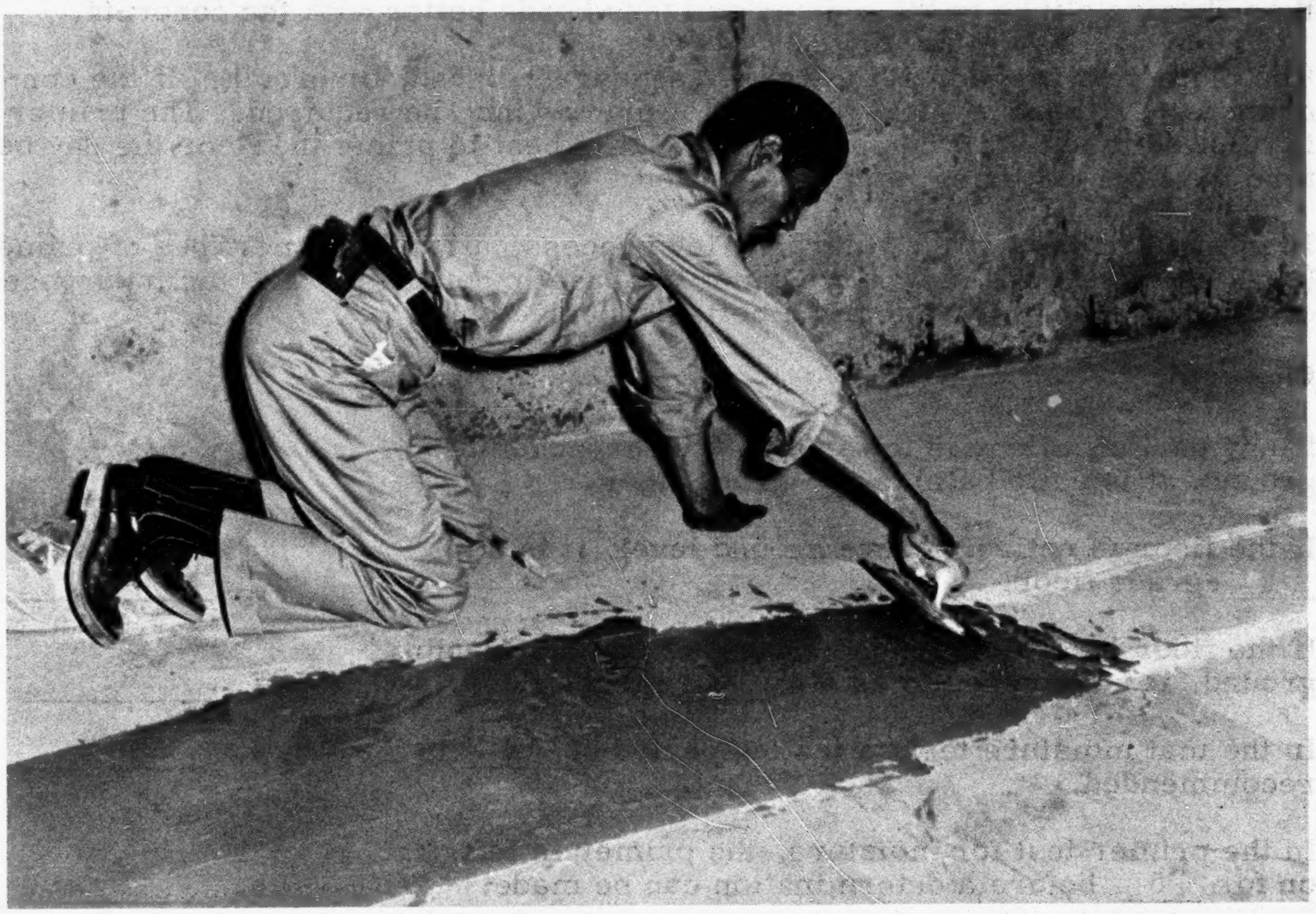


Fig. 15. Applying filler to concrete floor

All cracks, seams, and holes must be filled to the level of the floor surface. Any good commercial filler may be used in most cases. However, if the filler is to be feathered out, as it would be in a leveling process, a latex-type filler should be used. The use of fillers on concrete subfloors is explained in the assignment under "Mastic Underlayments."

Sealing concrete. Many good commercial floor sealers are on the market today. None of them, however, is absolutely guaranteed to seal moisture from a concrete floor. All of them will slow down the seepage of water through concrete, but because of changing conditions in the ground, no absolute claims can be made for any of them.

A concrete floor that is poured over a plastic membrane is usually considered waterproof, but breaks or tears in the membrane caused in pouring the concrete will permit water seepage. Therefore, a properly conducted moisture test before any resilient floor covering is installed is essential.

Priming concrete. On-grade or below-grade concrete floors and dusty or porous above-grade concrete floors should be primed with an approved primer. The primer, which is a thin solution of the adhesive, penetrates the pores of the concrete and acts as a binder between the concrete and the adhesive. In effect, the adhesive clings to the primer and thus bonds better with the concrete.

The primer is spread with a trowel, squeegee, brush, or broom. If the concrete is very porous, several coats of primer may be required. The primer is allowed to set until completely dry. It is best to prime the floor the day before the floor covering is to be installed.

Priming a floor is not a waterproofing process, although some types of primer (such as epoxy) will slow down water seepage in concrete. The main purpose of priming a floor is to obtain a better adhesive bond.

Checkup

If any part of a floor is lower than the surrounding ground, it is called a(n) ___1___-grade floor. 1. __________

If the floor is entirely above ground level, it is a(n) ___2___-grade floor. 2. __________

If the floor level is the same as that of the surrounding ground, it is referred to as a(n) ___3___-grade floor. 3. __________

In the mat moisture test, a testing period of ___4___ is recommended. 4. __________

In the primer test for moisture, the primer is left on for ___5___ before a determination can be made. 5. __________

If the mat moisture test shows that moisture is present in an on-grade floor, the only kinds of tile that may be used on it are ___6___ or ___7___-___8___.
6. __________
7. __________
8. __________

The best filler material to use where feathering out is required is ___9___ filler. 9. ___________

For cleaning a concrete subfloor of grease or oil, a 10 percent solution of ___10___ ___11___ is used. 10. ___________
11. ___________

Sometimes needed as a bonding agent between a floor and the adhesive is a(n) ___12___. 12. ___________

TOPIC 2— WOOD AND OTHER SURFACES

Introduction

- When is lining felt used and what precautions must be taken in its use?
- What are the most important items to check for on a wood underlayment?
- What is the most commonly used wood underlayment?
- Why is it not considered good practice to install new floor covering on top of old covering?

The preparation of wood floors prior to the installation of floor covering is much the same as for concrete in that the floor surface must be dry, clean, and level. The methods of attaining this, however, are different and the variety of types of wood floors makes the procedure more complex.

All wood floors should have at least 18" between the ground and the underside of the floor with sufficient ventilation to prevent dampness. If underlayment is not used, the surface of the floor must be entirely free from paint, wax, varnish, oil, or any other substance that will prevent a good bond.

Related Information

Stripwood Floors

Sanding. Most stripwood floors require sanding before the installation of resilient covering. The floor should first be inspected for evenness, since stripwood floors have a tendency to warp and cup. Any loose boards should be nailed securely and any broken ones should be replaced. All paint and varnish will be removed during the sanding process.

Stripwood floors should be sanded with a medium grit paper on a sanding machine run with the grain of the wood. If the floor is extremely uneven, the sander may be run at a 45-degree angle to the boards until the surface is level. A floor should never be sanded across the boards as this only causes exaggeration of the unevenness. If the sanding is to be done in a small, or confined, area, an edger or belt sander may be used.

After the sanding has been completed, a sanding sealer should be applied to the floor to prevent the moisture in the adhesive from being absorbed into the newly sanded floor, thus causing warping.

Lining felt. As a general practice, lining felt is used only with stripwood floors. The installer should observe the following points:

- After the felt has all been pasted and rolled, all paste should be cleaned from the surface of the felt as well as from the baseboards and walls.
- A careful check should be made at this time for any blisters in the felt. These must be corrected before the floor covering is installed as they will show through the finished floor and result in a poor installation.
- The lining felt should be protected with building paper if it is not to be immediately covered with resilient covering; otherwise excessive traffic on the felt will cause scuffing and tearing which will later show through the finished floor.

Board underlayments. Three basic types of wood or board underlayments are commonly used. These are hardboard, plywood, and particle board. Any of these three underlayments may be used to cover an unsatisfactory surface. However, the floor covering manufacturer's specifications should be consulted before the floor is installed, since some floor covering manufacturers will not guarantee their products if they are installed over certain types of underlayment.

Plywood, particle board, and hardboard underlayments are all installed in the same way, with one exception. The seams of plywood and particle board underlayments should fit snugly. No gap should be left between the panels (although a 3/8" gap should be left between the walls and the edge of the underlayment). With hardboard, a 1/32" gap should be left between sheets to accommodate possible expansion.

Board underlayments may be fastened with 3d or 5d ring-grooved or cement-coated nails spaced 3" apart around the perimeters of the panels, and from 1/2" to 3/4" from the edges. Nails should be spaced no farther than 6" on center throughout the rest of the panels.

If the underlayment is to be fastened with staples, an etched staple with a divergent chisel point should be used, one that extends into the subfloor at least 5/8", but not more than 1". Staples should be spaced 2" apart on the edges of panels, placed 1/2" to 3/4" from the edges. Through the rest of the panels, the staples should be placed on 5" centers.

Plywood Subfloors

Plywood subfloors are usually constructed of DFPA interior grade, or a good exterior grade such as DFPA CC (plugged) in sizes no larger than 4' × 8'. A plywood product known as 2-4-1 as specified by DFPA is the most suitable for single flooring. An even better type is 2-4-1 T&G, a 1-1/8" combination subfloor and underlayment. It has tongues on one side and one end and grooves on the opposite end and side. It may be applied directly on the floor joists, but the ideal installation is over 4' × 4' grid. In this way, all seams rest on a bearing surface and no additional bracing is required.

When checking a plywood subfloor, the installer should look for such things as improper nailing, loose boards and joints, and defects in the plywood itself. When cleaning the surface, the installer should remember that any irregularities on the surface will show through the finished resilient floor. Therefore, the floor must be thoroughly cleaned of all paint, varnish, cement or other substance. It may be necessary to use a power sander to prepare the floor for covering. If so, sanding should always be done with the grain of the wood.

During the manufacture of plywood, open knots or other voids may occur. These may result in holes under the top layer of the plywood. If such defects go unnoticed, the finished floor may easily be punctured. When such a defect is found, the top layer of the plywood must be removed and the hole filled.

All seams and holes in a plywood floor must be properly filled with a good commercial filler applied with a smooth trowel. Slight variations in the plywood seams can be corrected by carefully feathering the filler. Proper bonding of fillers is sometimes a problem, particularly on dusty floors. Commercial additives that help solve this problem are available, and the addition of a small amount of an emulsion-type adhesive to the filler is often valuable. Extremely dusty floors should be dampened immediately before application of the filler.

If the unevenness at the seams is too pronounced to cure with filler, a groove may be sanded first (as shown in Fig. 16) and then filler used to level the floor.

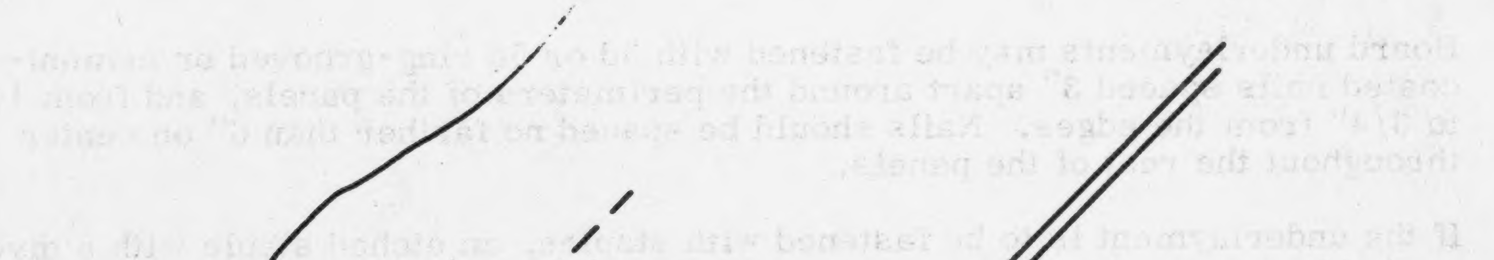


Fig. 16. How to groove an uneven seam properly

Other Surfaces

Existing resilient floors. For a satisfactory surface, old resilient floor covering should be either removed or covered with board underlayment before a new floor is installed. Under no circumstances should a felt underlayment be used over old resilient floor covering because it results in a surface that is much too soft.

For the sake of economy, however, the installer is sometimes required to install a new floor directly over the old floor covering. This is not the best kind of installation. In most cases, the new floor will adhere sufficiently to the old one, but there is no guarantee that the great drawing power of the adhesive will not pull up the old covering. The installer has the additional disadvantage of not knowing, in most cases, how well the original floor was laid, nor what adhesive was originally used. As a general rule, this type of installation is not recommended and should be avoided whenever possible.

If a new floor covering is to be installed directly over an old floor covering without an underlayment, the entire area must first be checked for loose spots. Any such places should be cemented and rolled thoroughly (see Unit I). The entire floor should then be sanded with a coarse grit paper to remove all wax and to ensure a good bond.

If the existing floor is coved, the cove must be removed. The field material is cut along a line on the floor approximately 1/4" from the cove wood. Then all material is removed from that point up the cove to the metal strip. Patching plaster is then used to fill the gully between the edge of the field material and the cove wood.

Metal subfloors. Occasionally a floor covering installer lays resilient covering on metal subfloors. Most important to remember is that such a floor must also be true and even before a covering is placed on it. A mastic underlayment should be used for smoothing if rivets, lap joints, or welds protrude above the surface level of the floor.

Checkup

A sanding machine used on stripwood floors should be run across the grain of the wood. 1. T F

Lining felt should be cut so it fits snugly against vertical surfaces. 2. T F

Buckles or blisters in the lining felt are of no consequence because the weight of the material will compress them. 3. T F

Panels of plywood underlayment should be fitted snugly together. 4. T F

Sections of hardboard underlayment should be placed 1/8" apart for best results. 5. T F

Hardboard panels should be laid with the smooth side down. 6. T F

When the floor boards in adjoining rooms run in different directions, the point where they meet in a doorway should be covered with an extra thickness of lining felt. 7. T F

If staples are used to fasten plywood underlayments, they should be spaced throughout the panel on 5" centers. 8. T F

Lining felt is recommended for use over an old resilient flooring. 9. T F

Sanding with emery paper is recommended for removal of paint from a wood subfloor. 10. T F unit E

TILE LAYOUT AND INSTALLATION

For a neat, balanced installation of resilient floor tile, the correct layout is the first requisite. Incorrect layout will result in time wasted during the installation, poor appearance, and perhaps the replacement of the entire job.

This unit discusses square and diagonal layout and installation and includes a special topic on wet-laying procedures. If the correct adhesive is applied in the prescribed manner over a floor that is clean, even, and without imperfections, and a well-planned tile pattern is laid, the end result will be an attractive and serviceable floor covering.

Close attention to details when performing this work will enable the apprentice to master the art of resilient tile laying to the extent that his jobs will always have the professional appearance that is the hallmark of the master craftsman.

TOPIC 1— SQUARE LAYOUT

Introduction

- How should room measurements be made for tile layout?
- How are border widths determined?
- How is the center of a circular room located?
- How is a perpendicular line erected?

Two things should be considered in preparing to lay out a tile floor: (1) the border should be as nearly balanced as possible, and (2) tile waste should be kept to a minimum. Both of these requisites can be met only by careful planning from the very beginning.

Tile layout falls into two categories: (1) square layout, where the tile run parallel to the walls of the room; and (2) diagonal layout, where the tile are set at a 45° angle to the walls. When an irregular-shaped room is involved, the predominate walls should be used as guides, unless there is a reason for not doing so, such as the presence of a main entrance on another wall which might be used as a base point.

Related Information

Measurements should be taken across the length and width of the room. These measurements should be made at both ends of each wall to determine whether the room is square, or nearly so. If the room is not square, it will be necessary to make adjustments in the layout in order to retain a square field and obtain satisfactory borders.

Determining Border Width

General rule. Fundamentally, the space to be used by border tile (cut tile at the edges of the room) is determined by dividing the room dimensions by the size of the tile. The steps are as follows:

Step 1. Determine length and width of room in inches.
Step 2. Divide each by the tile size. The remainder is for border.

Using the room illustrated in Fig. 17 as an example, the problem can be worked as follows:

Length 204" Width 149"

204" ÷ 9" = 22 full tile with 6" remaining for border
149" ÷ 9" = 16 full tile with 5" remaining for border

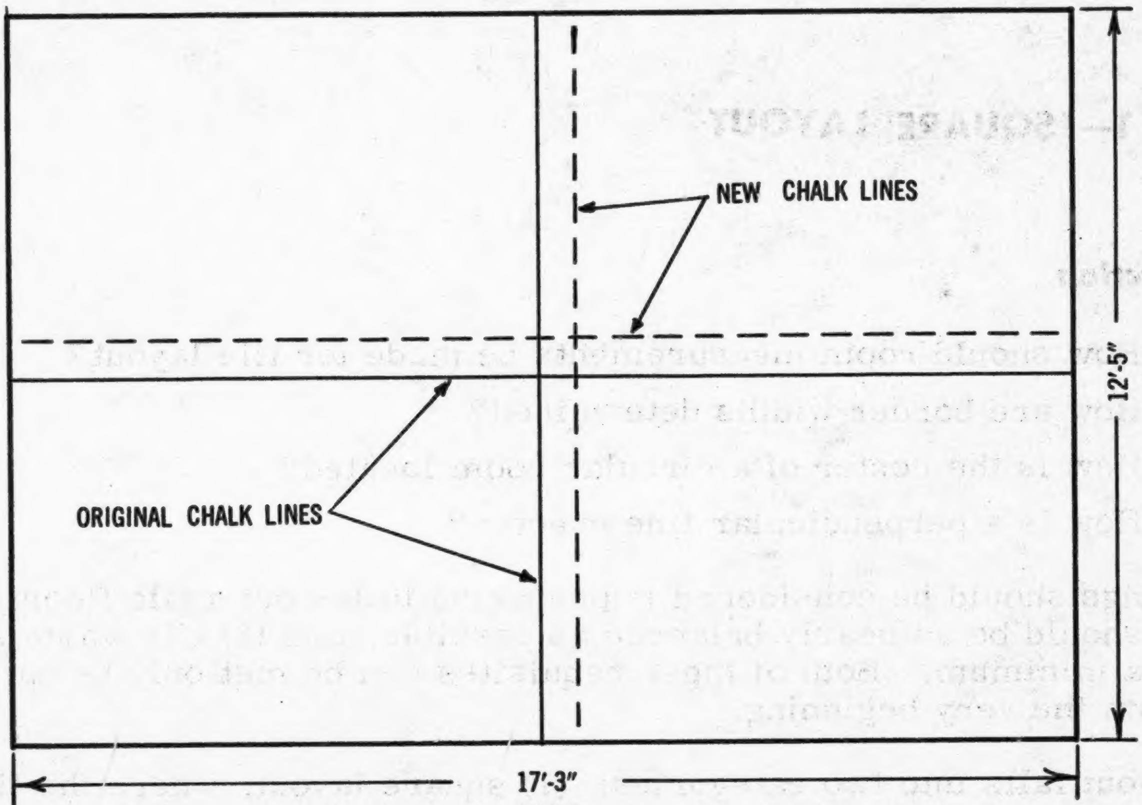


Fig. 17. Laying out a room for square installation

Since the border should be equal on both ends of the room and equal on both sides, the 6" and the 5" must be divided by 2. This would give borders of 3" and 2-1/2", which would not be adequate if, as is sometimes preferred, border of at least 4" is to be maintained. In this case, the width of one tile is added to the 6" to make a total of 15" and to the 5" to make a total of 14". The borders are then determined to be 7-1/2" and 7".

It is not usually considered desirable to use full tile as a border, since this allows no cutting leeway in case the room is not absolutely square. It is preferable in such cases to use a half-tile border on each side, which gives more opportunity for making adjustments.

Special rule for 9" tile. In working with 9" tile, a special rule called the "rule of nines" is sometimes used to determine the width of the border. It works as follows:

Step 1. Add the numerals in the number of inches measured. The total--if it contains only one numeral--is the remainder for border.

Step 2. If the result of Step 1 has two numerals, add those two. This total is the remainder for border.

Using the same room (Fig. 17), the problem is worked as follows:

149"	1 + 4 + 9 = 14	204"	2 + 0 + 4 = 6" for border
	1 + 4 = 5" for border		(Step 2 is unnecessary)

Note that this method, while effective for determining border width, does not indicate the number of rows of full tile needed between the borders.

Rule for 12" tile. When 12" tile is used, the measurement may be made in feet and inches rather than in inches alone, since the number of feet in each dimension indicates the number of full tile needed and the number of inches indicates the total border width. A dimension of 17' 3" (Fig. 17) indicates that 3" will be left for border. If this is considered inadequate, the width of one full tile, or 12", should be added to the 3", to give a border width of 15", or 7-1/2" on each side.

Tile patterns. When a tile pattern is laid out, the full pattern should be considered as one tile. For example, a 27" pattern to be installed in the room shown in Fig. 18 should be looked upon simply as a series of 27" tile. The steps are the same as for any other size, and when full tile width is to be added to the remainder to give adequate border width, the full 27" is added.

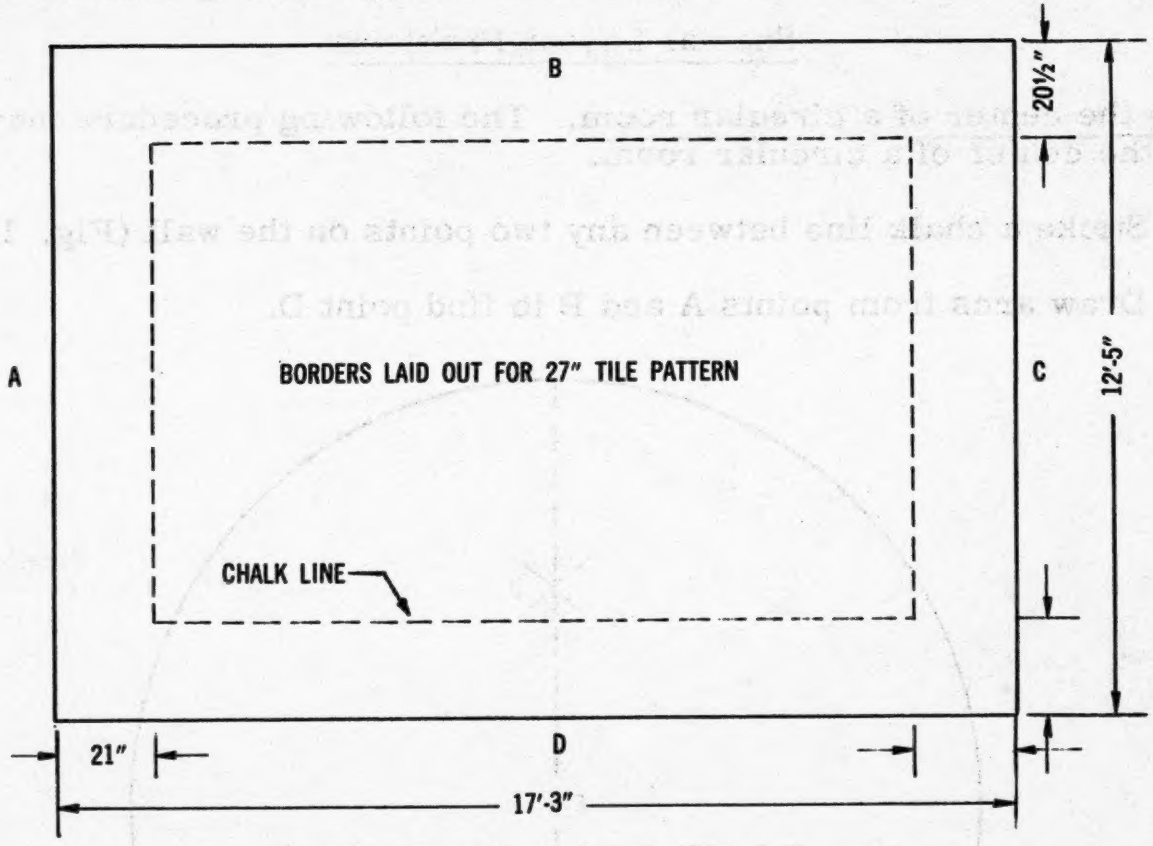


Fig. 18. Layout procedure for 27-inch tile pattern

Using the length of the room in Fig. 18:

204" ÷ 27" = 7 full patterns with a remainder of 15"
15" + 27" = 42"
42" ÷ 2 = 21" for balanced order

Striking Chalk Lines

When the border widths and number of rows of field tile needed have been determined, the next step is to strike chalk lines to find the starting point for the first tile. Using the room in Fig. 17, proceed as follows:

1. Determine the midpoints of the two shortest walls (A and C) and strike a chalk line on the floor connecting these two points.
2. Determine the midpoint of this line and strike a second line perpendicular to the first and extending to walls B and D. (Do not use the midpoints of walls B and D to determine where to strike the second line, since rooms are not usually exactly rectangular.)

If it is desired to begin laying tile at a point away from the center of the room, these lines may be moved in any direction by an amount equal to any multiple of the size of tile being laid. If calculations indicate that the number of field tile across the room (in either direction) will be odd rather than even, one or both lines should be moved half the width of the tile (Fig. 17), or half the tile width plus any multiple of the full tile width.

The intersection of these two lines gives a starting point for laying the tile.

Special Layout Problems

Finding the center of a circular room. The following procedure may be used to find the center of a circular room:

1. Strike a chalk line between any two points on the wall (Fig. 19, AB).
2. Draw arcs from points A and B to find point D.

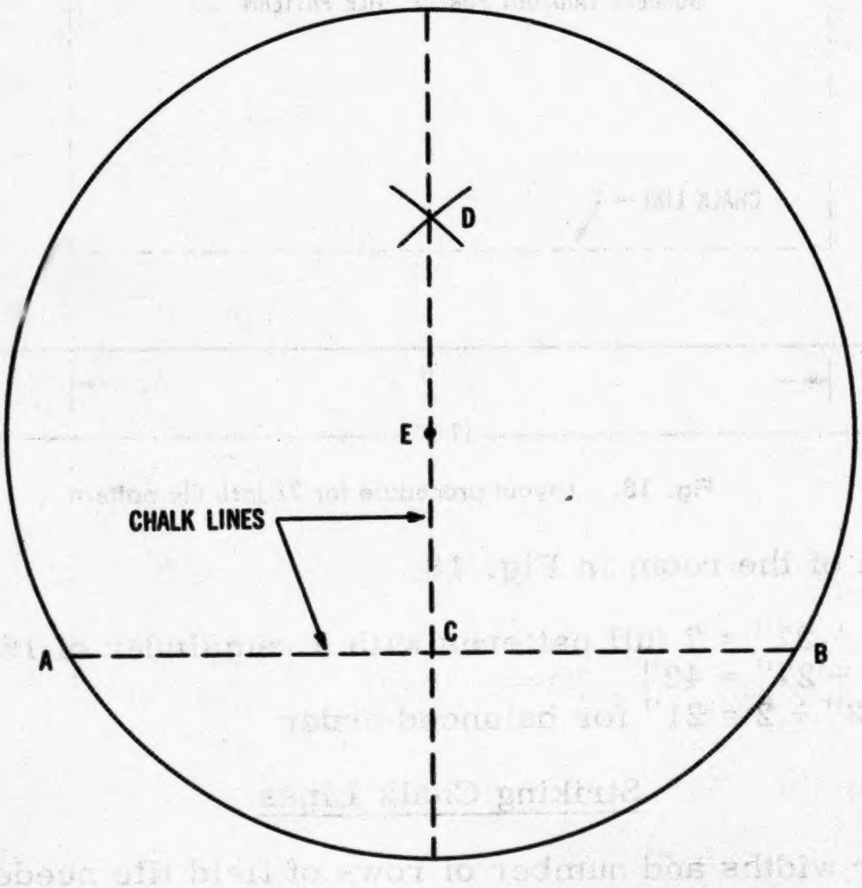


Fig. 19. Laying out a circular room

3. Strike a chalk line through point D to point C, which is the half-way point between points A and B. This line, CD, is a center line of the room, and the midpoint on this line is the center point of the room (E).

Use steel tapes or a board with a nail in each end to form the arcs. The use of a string is not recommended because string has a tendency to stretch.

Erecting a perpendicular line. The method described for finding the center of a circle may also be used in any kind of room for erecting a perpendicular line, because the resulting line is perpendicular to the original chalk line.

Another method that may be used is the 3-4-5 method of constructing a right triangle. Using Fig. 20 as an example, the steps are as follows:

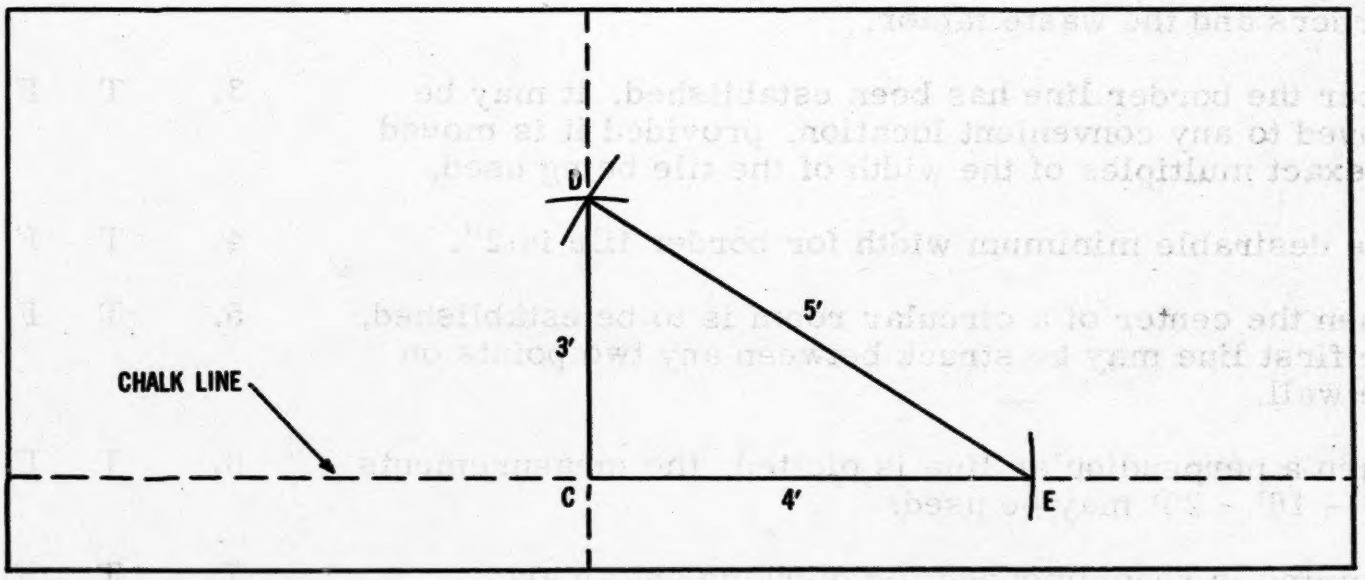


Fig. 20. Rectangular layout, using the 3-4-5 method

1. To erect a perpendicular to line AB, first determine the point (C) at which the perpendicular is needed. (If a center line is needed, the perpendicular must run through the center of line AB. Otherwise, it may run through any point on the line.)

2. Using a steel tape, strike an arc 3' from point C toward the center of the room.

3. Measure 4' from point C toward point B along line AB (point E).

4. Strike an arc 5' from point E toward the center of the room, intersecting the first arc. The junction of the first arc and the second arc determined point D.

5. Strike a chalk line through points C and D. Line CD is the desired perpendicular.

A simple way of checking the accuracy of the points plotted by this method is to measure 4' from point C toward point A on line AB (Fig. 20). Using this new point as a base, strike another arc 5' out in the direction of the recently established point D. This new arc should intersect the junction of the original two arcs. If it does not, replot all points to find and correct the error. In large rooms, the 3-4-5 method may be expanded by using any multiples of these measurements, such as 6-8-10 or 9-12-15.

Checkup

Layout lines may be adjusted at any time during the installation. 1. T F

In layout, consideration should be given to both balanced borders and the waste factor. 2. T F

After the border line has been established, it may be moved to any convenient location, provided it is moved in exact multiples of the width of the tile being used. 3. T F

The desirable minimum width for border tile is 2". 4. T F

When the center of a circular room is to be established, the first line may be struck between any two points on the wall. 5. T F

When a perpendicular line is plotted, the measurements 12' - 16' - 20' may be used. 6. T F

A string is recommended for marking out an arc. 7. T F

In the layout of a pattern job, the repeat of the pattern takes the place of the individual tile as the multiple unit. 8. T F

After an area has been laid out for 9" x 9" tile, 12" x 12" tile may be substituted without changing layout lines. 9. T F

In a square layout the tile runs parallel with the walls. 10. T F

TOPIC 2— DIAGONAL LAYOUT

Introduction

- Why is it important to maintain the 45° angle in laying out diagonal tile?
- For what purpose is tile laid dry first?
- How may border width be determined by calculation?
- How is a 45° line established?
- After guidelines have been struck, can they be moved?

Correct diagonal layout requires the tile to run at a 45° angle to the walls. If this angle is not maintained, an uneven appearance results. Diagonal layout requires a little more time than square layout. If the layout is done properly, however, installation is less difficult and the finished job is much more attractive.

Related Information

Method using perpendicular guidelines. The border for a diagonal layout may be determined by dividing the room dimensions by the diagonal width of the tile. For 9" × 9" tile this may be done by dividing the dimensions by 38", the approximate diagonal width of three tiles. If the remainder is too wide for the borders, it may in turn be divided by 12-3/4", the approximate diagonal width of one tile. With 12" × 12" tile, the dimensions may be divided by 17". This calculation tells the installer quickly approximately how wide his border will be. The center layout can then be adjusted to obtain this border.

Another method is dry-laying the tile. First find the centers of two opposite walls and strike a line across the room between them (line AC, Fig. 21). Next determine the center point of this line and erect a perpendicular at that point (line BD, Fig. 21).

Lay tile dry along these chalk lines, starting from the center of the room, to determine the width of the border. It may be necessary to shift the position of tile at the center in order to obtain a satisfactory border (Fig. 22).

If a diagonal layout is to be laid with contrasting tiles, the problem of color at the border must also be considered. It is essential that the same color dominate all borders, otherwise the finished floor has an unbalanced look. Quite often it is necessary to shift the center layout in order to get this balance (Fig. 22).

After the perpendicular lines have been struck, the border determined, and the center layout planned, the installer may begin installation, using the original perpendicular lines as guidelines to align the opposite corners of the tile (point-to-point).

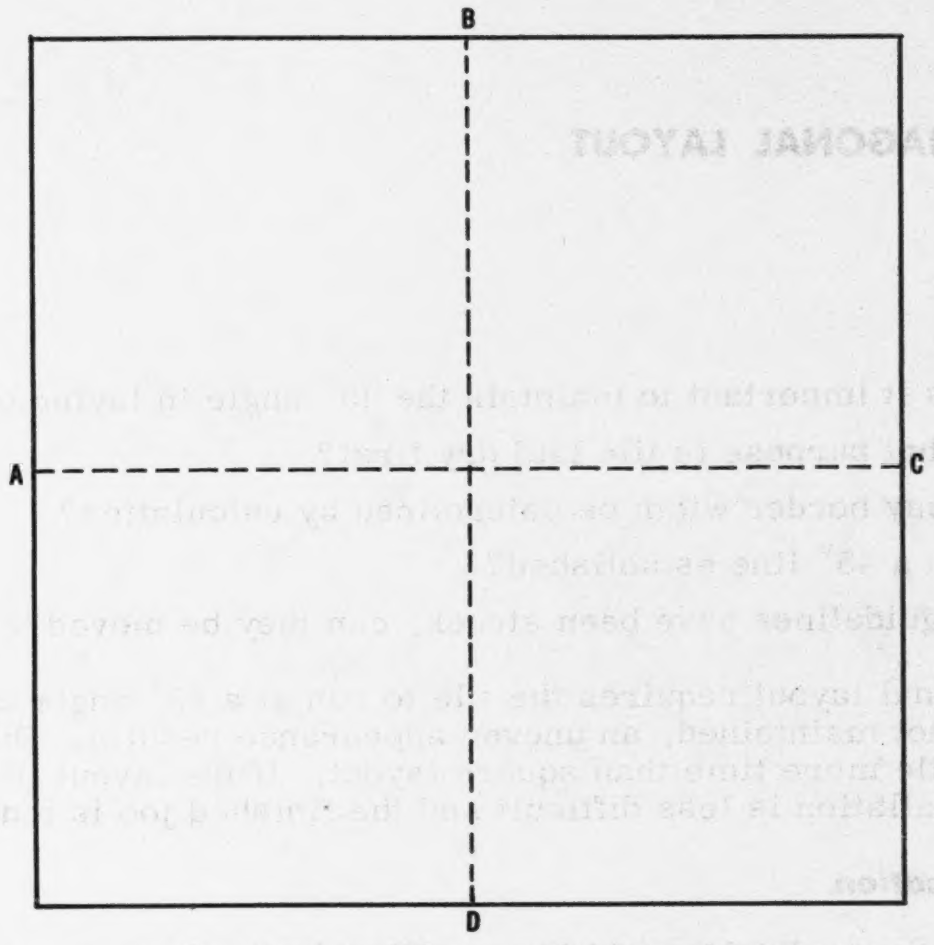


Fig. 21. **Initial step in laying out for diagonal pattern**

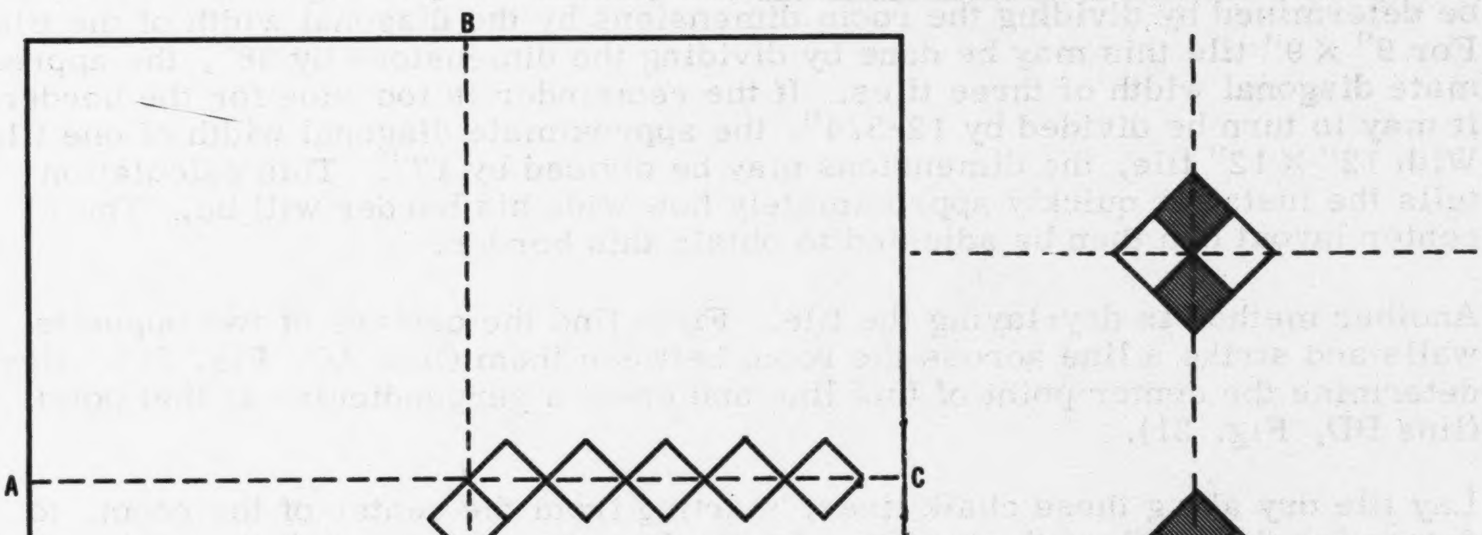


Fig. 22. **Dry laying of tile to determine borders**

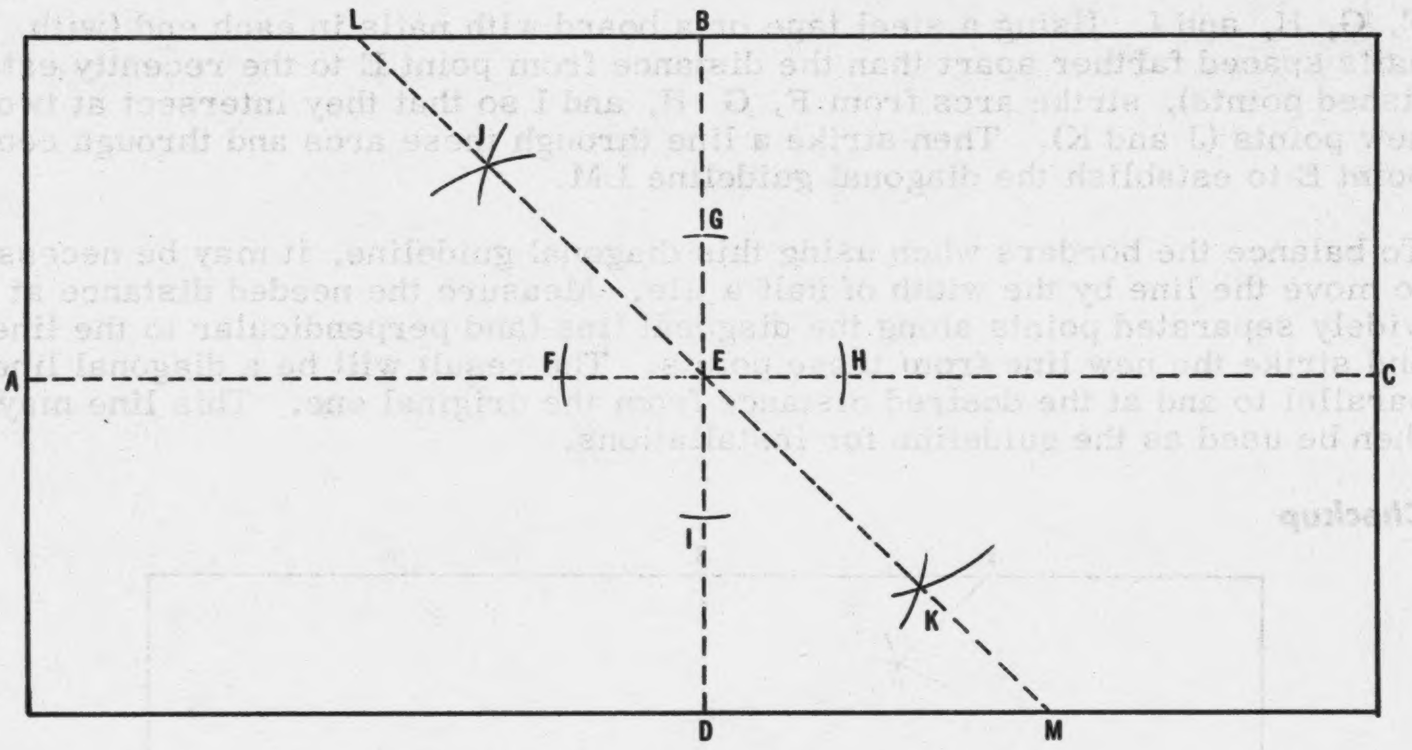


Fig. 23. Marking a 45° angle from center of room

Method using 45° guidelines. Another method of diagonal layout is using a 45° guideline to align the edges of the tile. After the border and center layout have been determined, it is necessary to bisect the 90° angle formed by the two perpendicular lines in the center of the room. To do this, measure an equal distance from point E (Fig. 23) in each direction on the perpendicular lines in the center of the room. Mark the lines at those points to establish

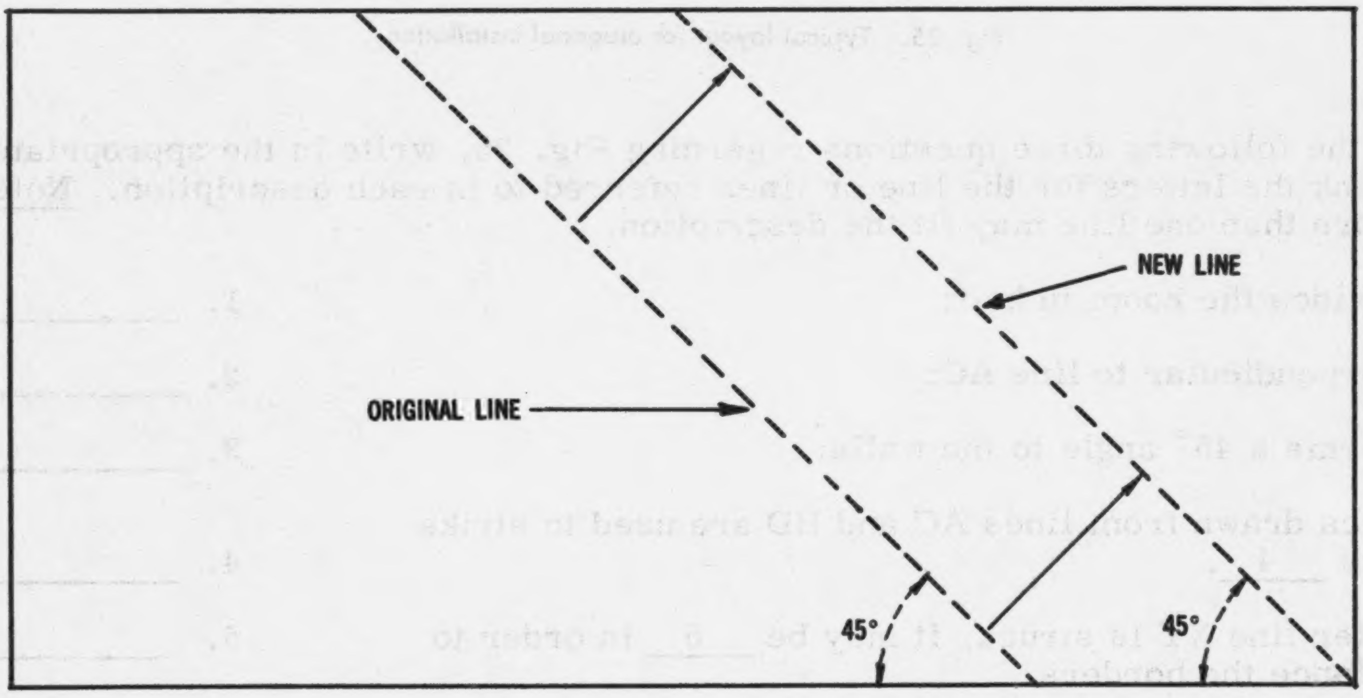


Fig. 24. Shifting a diagonal line for convenience

F, G, H, and I. Using a steel tape or a board with nails in each end (with nails spaced farther apart than the distance from point E to the recently established points), strike arcs from F, G H, and I so that they intersect at two new points (J and K). Then strike a line through these arcs and through center point E to establish the diagonal guideline LM.

To balance the borders when using this diagonal guideline, it may be necessary to move the line by the width of half a tile. Measure the needed distance at two widely separated points along the diagonal line (and perpendicular to the line) and strike the new line from these points. The result will be a diagonal line parallel to and at the desired distance from the original one. This line may then be used as the guideline for installations.

Checkup

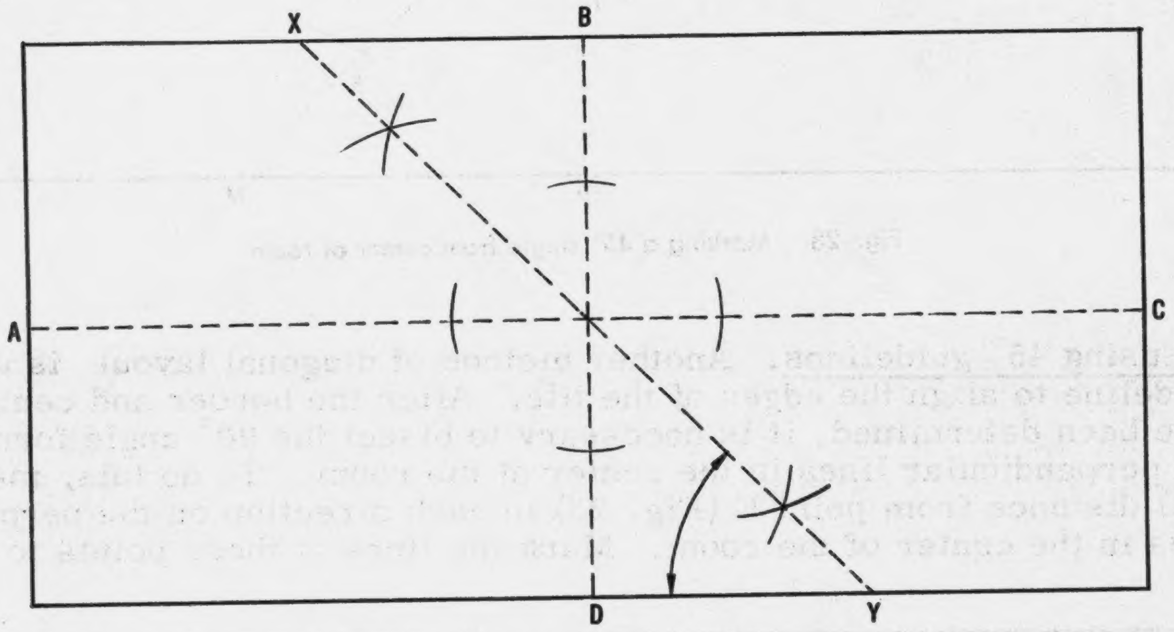


Fig. 25. Typical layout for diagonal installation

In the following three questions regarding Fig. 25, write in the appropriate blank the letters for the line or lines referred to in each description. Note: more than one line may fit the description.

Divides the room in half: 1. ____________

Perpendicular to line AC: 2. ____________

Forms a 45° angle to the walls: 3. ____________

Arcs drawn from lines AC and BD are used to strike line __4__. 4. ____________

After line XY is struck, it may be __5__ in order to balance the borders. 5. ____________

Diagonal tile may run at an angle other than 45° in long narrow rooms. 6. T F

Diagonal layout is extremely time-consuming. 7. T F

Tile may be laid dry along the center lines to determine the border width. 8. T F

It is necessary to know how to bisect an angle in order to lay out diagonal tile. 9. T F

String should always be used to draw the arcs for bisecting angles. 10. T F

Diagonal layout should be done before the paste is spread. 11. T F

Determining border width is less important with diagonal layout than with square layout. 12. T F

Border width may be determined by dividing the room dimension by the diagonal width of the tile. 13. T F

The guidelines for diagonal tile layout may be parallel to the walls. 14. T F

There is no quick, accurate method for making a diagonal tile layout. 15. T F

TOPIC 3— SQUARE INSTALLATION

Introduction

- What is the proper method of starting a tile installation?
- How are straight and irregular walls cut in?
- How are tiles measured and marked to fit around door jambs?

Although this topic is based primarily on procedures for square installation of asphalt and vinyl-asbestos tile, the measuring, fitting, and cutting methods described apply to most types of floor tile.

Related Information

Adhesives

After the area has been laid out, the next step is spreading the adhesive. During the spreading, the previously established layout marks must be preserved. This may be done any one of several ways. The easiest way is to secure one end of the chalk line to a nail in the floor on the starting line farthest from the starting point. Secure the other end of the chalk line so that the line is off the floor while adhesive is being spread. Another method is to spread adhesive in a narrow strip over the general area where the starting line will be, allow this adhesive to set up, snap the line, then spread the balance of the area.

The recommendations of the manufacturer should be followed regarding the type of spreader to be used and the spreading rate of the adhesive, which varies according to the porosity of the floor. For instance, there is a greater rate of spread over a dense concrete floor than over a wood floor.

A slightly coarser spreader is used for asphalt tile adhesives than for vinyl-asbestos tile or linoleum adhesives. For best results when adhesive is spread for vinyl-asbestos tile, the ridges should be smoothed to a thin film after the spreader grooves have laid the right amount of adhesive on the floor.

Adhesives should be spread with a sweeping motion in both directions. Sufficient pressure would be applied to the spreader to leave only a light film on the floor between the grooves or notches of the spreader. The entire floor should be covered at one time.

Field Tile

After the adhesive has set up and the starting line has been struck, begin application of field tile. Work on top of the tile as it is installed. Starting near the center of the room (usually in line with a doorway), lay one or two rows of tile along each side of the layout line, from the center to the wall. Then return to the center and lay the rows along the layout line to the opposite wall (Fig. 26). Take extreme care to make the rows straight and make the tile fit tightly, since these rows will be the basis for the squareness and alignment of the entire installation.

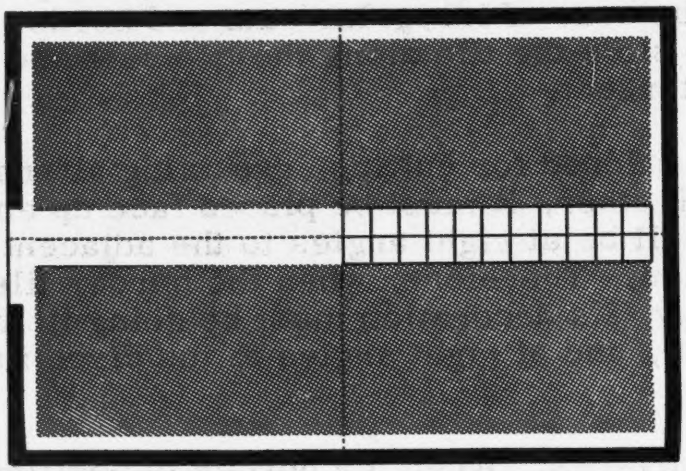


Fig. 26. First rows of tile laid

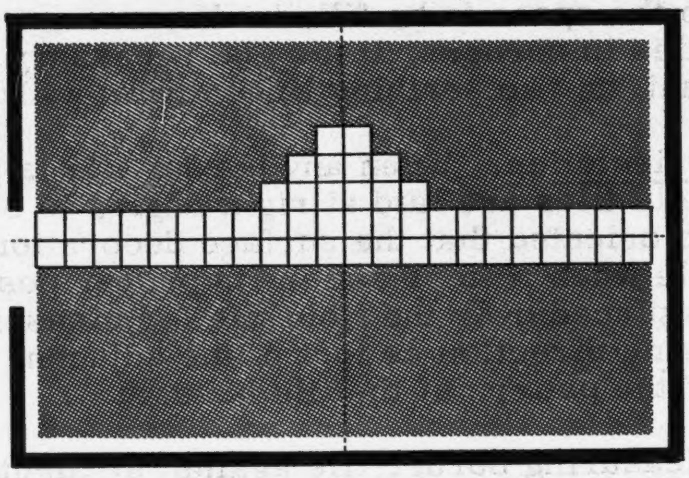


Fig. 27. Pyramiding tile from first row

In the next step, begin on one side of the starting row, near the middle, pyramiding or stairstepping the tile out into the room (Fig. 27). Cover the entire field area in this way. The border tile, or "cut-in" area, remains.

Usually tile is laid so that the grain in each tile is at right angles to the grain in the adjacent tiles. All tile has certain directional characteristics that govern expansion and contraction due to temperature, humidity, and moisture content changes. If tile is laid with the grain running in the same direction throughout, expansion and contraction are cumulative. If alternate tiles are at right angles to each other, peaking or loss of bond due to expansion is much less.

Border Tile

The difficulty involved in measuring and cutting the border tile, often referred to as "cutting in," depends on the complexity of the cuts required, which may vary from a parallel to a diagonal, or irregular line.

In cases where the wall line is straight and parallel with the edge of the field tile, it is merely necessary to measure the width needed and cut the tile to this width. However, when irregular cuts are required, a more complicated procedure is used. Since it is impossible to trace the wall outline onto the tile, it must be projected or transferred by some means onto the surface of the border tile to be cut.

Where the contour of the wall varies from tile to tile, a prescribed method of measuring and marking is used. First, remember the following:

1. The tile must fit exactly into the space between the field tile and the wall, butting against the field tile on one side and against the wall on the other side.

2. The tile edge against the wall must follow the contour of the wall, including any irregularities.

Positioning. To meet the requirements listed, the border tile to be cut must be carefully positioned before the outline of the wall is projected onto its face. The most practical way to do this is to align directly over the field tile adjacent to the space to be filled. However, in the case of irregular cuts and border tiles in corners, it may be necessary to slide the tile along the tile seam so that the two scribing lines drawn will intersect.

Orientation. When any border tile is positioned for cutting, assuming alternate field tiles are laid at right angles to each other, it must be placed face up and so oriented that the surface decoration will be at right angles to the adjacent tile when it is placed in its proper position. Therefore, when the border tile is placed over the field tile for measuring, its decoration must be going in the same direction as that of the adjacent tile, and at right angles to the direction of the pattern of the tile beneath it.

Measuring border tile against straight surfaces. When the border is positioned for cutting, it is exactly one tile width away from the position it will finally occupy. Therefore, a common practice is to use a whole tile as a measuring device or template. If scribers or dividers are used, they must be set to the width of a full tile.

The measuring tile, which overlaps the border tile to be cut, should always be positioned with sides parallel to the rows of field tile. Both the border tile to be cut and the measuring tile must be held firmly in place while measurements are being made.

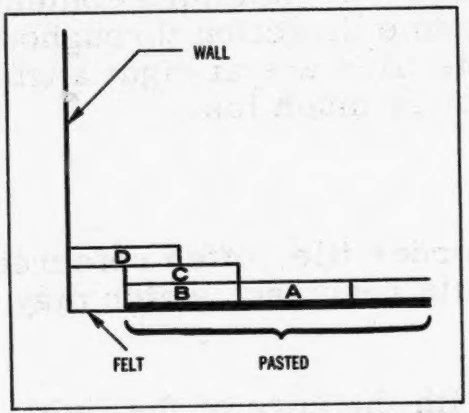


Fig. 28. Tile C is placed directly over tile B as shown. Tile D is then placed against wall so it overlaps tile C

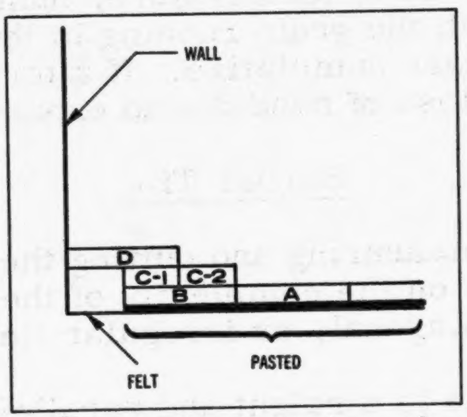


Fig. 29. Scribe tile C along edge of D and cut into two parts, shown as C_1 and C_2

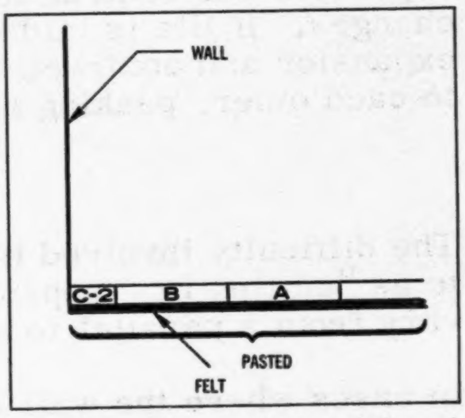


Fig. 30. Remove tile D and C_1 and snap C_2 in place against wall

- If no tile cutter is available, the procedure for measuring border tile when the side walls are parallel to the tile rows is as follows:

  1. Position and orient the border tile to be cut directly over the field tile adjacent to the space to be filled.

  2. Butt the measuring tile against the wall, overlapping the border tile to be cut (Fig. 31).

3. Holding both tiles firmly in place, mark the face of the border tile along the front edge of the measuring tile (Fig. 32).

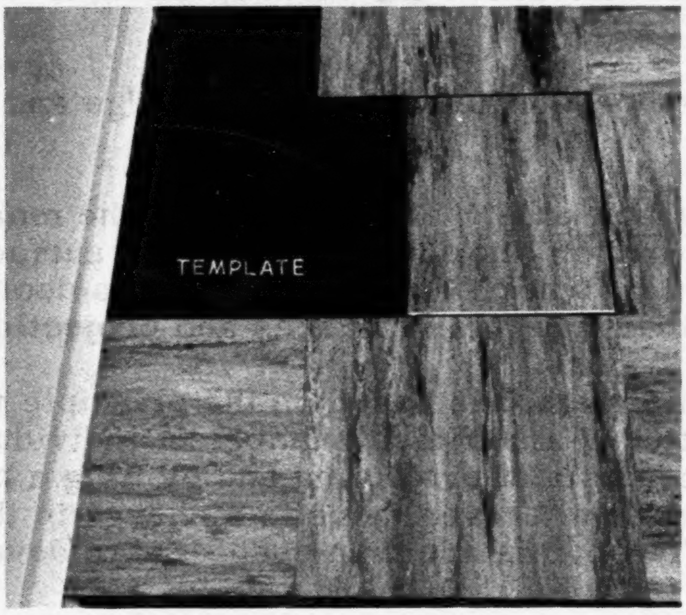


Fig. 31. Positioning border tile for scribing

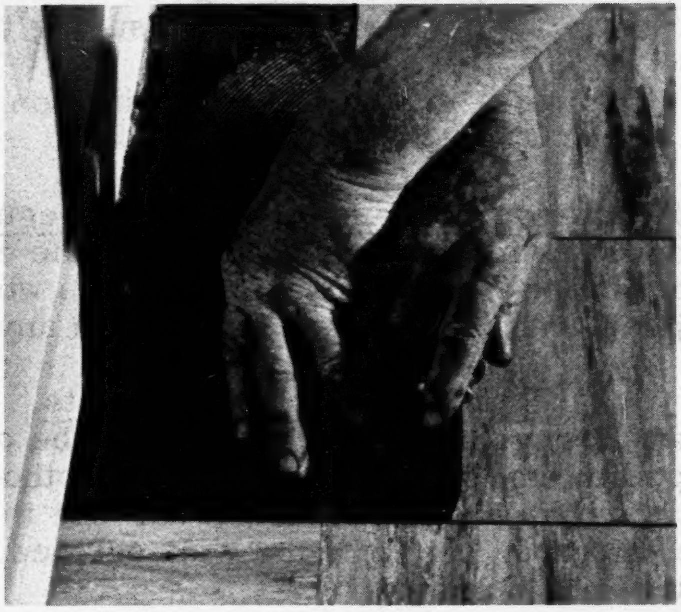


Fig. 32. Scoring tile

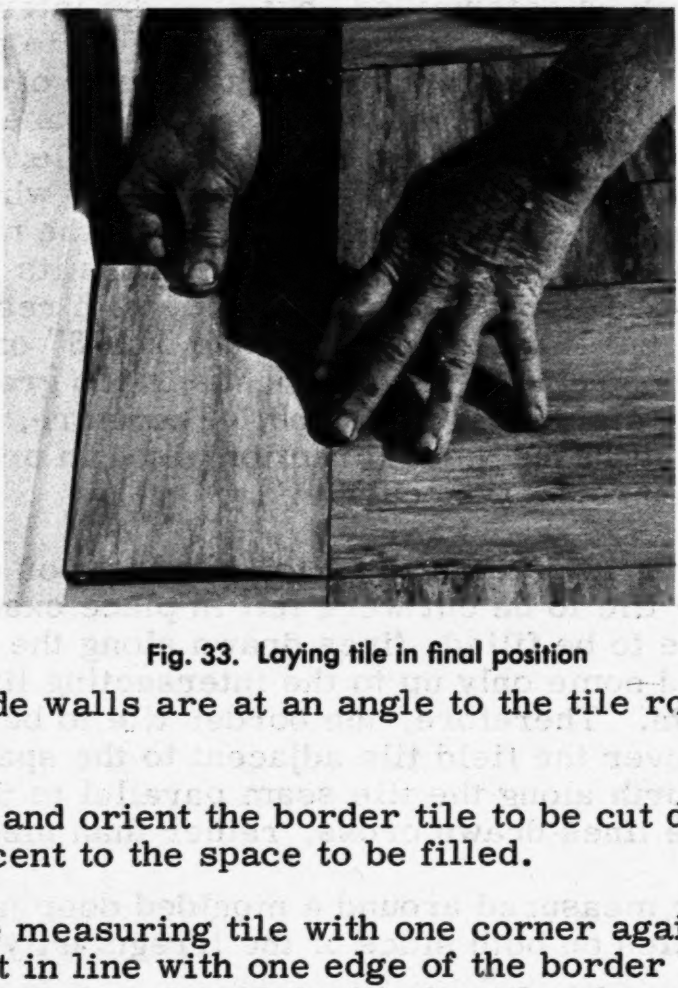


Fig. 33. Laying tile in final position

- When the side walls are at an angle to the tile rows, the procedure is as follows:

1. Position and orient the border tile to be cut directly over the field tile adjacent to the space to be filled.

2. Align the measuring tile with one corner against the wall surface at a point in line with one edge of the border tile to be cut. Mark the point on the edge of the border tile where the corresponding front corner of the measuring tile falls.

3. Align the measuring tile with one corner against the wall surface at a point in line with the other edge of the border tile. Mark the point on the edge of the border tile where the corresponding front corner of the measuring tile falls.

4. Connect the two points on the border tile with a straightedge and mark or score the line.

Measuring border tile against irregular surfaces. The following is the most complex method of determining the contour or line followed by a wall surface. It is most frequently used on jobs where it is necessary to fit around a door jamb, but it may also be used on any other irregular surfaces and projections.

Principle of plotting points. This method is based on the principle that any irregular line or curve may be plotted if a sufficient number of individual points can be connected. The method consists of projecting and plotting a point onto the surface of the border tile to be cut wherever there is a change in the contour or shape of the wall surface. The points are then connected to develop the wall contour.

Measuring is done in two steps, since not only must the distance out from the wall line or door jamb be determined, but also the lateral or side-to-side placement. It might seem that it should be possible to project the wall surface onto the border tile by tracing the path of the corner of the measuring tile as it is slid along the wall surface, but this is not the case. The fallacy in this method can best be demonstrated by citing an example, using 9" X 9" tile. Almost inevitably, some slight misalignment occurs when the measuring tile is slid along an irregular surface. Assuming that the misalignment of the measuring tile is only slightly under 1° as it traces its path along the wall, this 1° makes a difference of less than 1/1000" with respect to the distance away from the wall, but it makes a difference of 1/8" or more in the lateral, or side-to-side, measurements. Nine inches is too great a distance over which to scribe accurately by this method. Therefore, the tile must be repositioned and measured in the other direction also, in order to place the lateral or side-to-side measurements accurately.

Each of the plot points is positioned by the intersection of two perpendicular lines. If the border tile to be cut were left in place exactly over the field tile adjacent to the space to be filled, lines drawn along the front edge of the measuring tile would come only up to the intersecting lines, not through the points of intersection. Therefore, the border tile to be cut is oriented for decoration, placed over the field tile adjacent to the space to be filled, and then slid back and forth along the tile seam parallel to the wall as necessary, in order to make the lines drawn cross, rather than meet, the intersecting lines.

Before tile is cut or measured around a moulded door jamb or other irregularity, the border tiles on both sides of the irregularity should already be cut and in place.

First series of measurements.

1. With the border tile positioned and oriented, align the measuring tile so that one corner of the measuring tile is against the wall surface in line with one edge of the border tile which is to be cut along the front edge of the measuring tile (that is, the edge away from the wall).
2. Slide the measuring tile along the wall to the point where the corner meets the moulded door jamb or irregularity as it projects from the wall. Slide the border tile to be cut along the tile seam to a point a short distance away from the door opening. Mark a line along the front edge of the measuring tile.
3. Slide the measuring tile away from the wall to the corner of the face of the moulded door jamb or irregularity. Draw another line along the front edge of the measuring tile on the face of the border tile to be cut.
4. Continue to draw additional lines in the same way, one line for each face of the moulded door jamb or irregularity (Fig. 34). It will not be necessary to reposition the border tile to be cut until the door jamb or irregularity starts to go back in toward the wall. Then slide the border tile along the seam parallel to the wall to a point a little past the door opening.

Fig. 34. Starting to plot for door

Second series of measurements.

1. Without turning or rotating the border tile to be cut, shift its position into the doorway, opposite the moulded door jamb. Place it over the next border tile, which is already in place, and align it with the tile seam perpendicular to the wall surface. Slide the tile into the room along the seam at least as far as the door jamb or irregularity projects into the room.
2. Align the measuring tile, placing one corner opposite the back edge of the door jamb and the other corner over the border tile to be cut. Mark on the border tile along the edge of the measuring tile, intersecting the lines for the wall behind the moulded door jamb and for the corner of the face of the jamb.
3. Moving the measuring tile toward the center of the doorway, continue to draw additional lines for each point where the wall or door jamb changes its contour or shape. The measuring tile must continue to be held in alignment, so that this second series of lines will also be parallel. Each line in the second series must intersect the corresponding line for the same point in the first series, and must be perpendicular to the lines made in the first series.

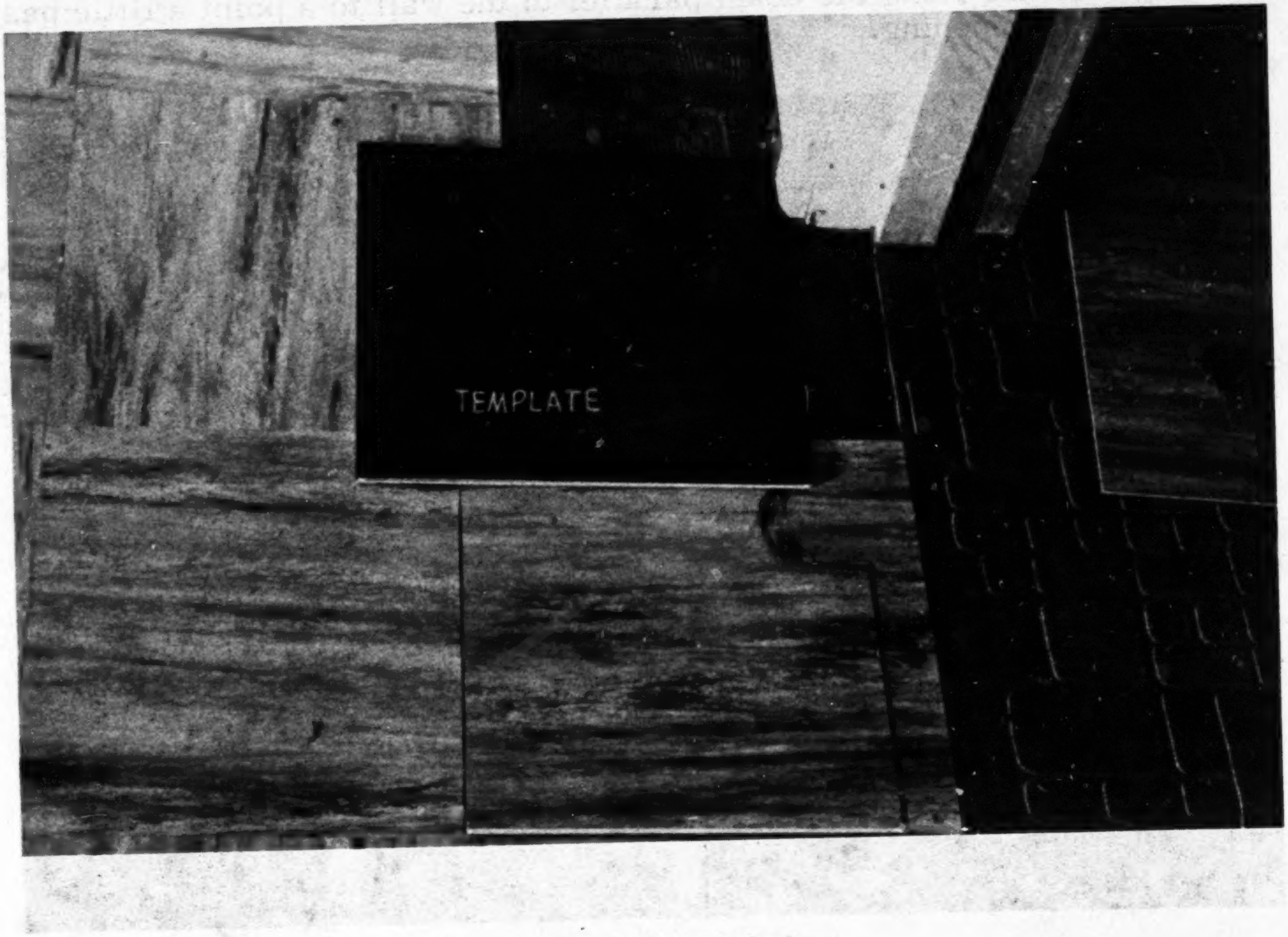


Fig. 35. A finished plot line

4. Connect each of the points determined by the series of plot points to form the contour of the moulded door jamb and wall. Draw in curves connecting the plot points (see Fig. 35).

Measuring for corners. Tile which are to be cut to fit into the corner of a room are measured by placing them first on one side of the corner, over the border tile which have already been "cut in," and then over the border tile on the other side of the corner. All of the procedures applying to alignment and positioning must be followed.

Cutting tile. The most common practice in making straight cuts is to use a tile cutter. If the cut is square, set the gauge on the tile cutter to the desired dimension and cut the tile (Fig. 36). If the cutting line is straight from one side of the tile to the other but at an angle, it may still be cut on the tile cutter.

Certain hard tiles, such as asphalt tile, generally lend themselves to snapping; score the surface and snap the tile apart along the scored line (Fig. 37). Softer materials, such as vinyl, cork, and rubber tiles, are easily cut through.

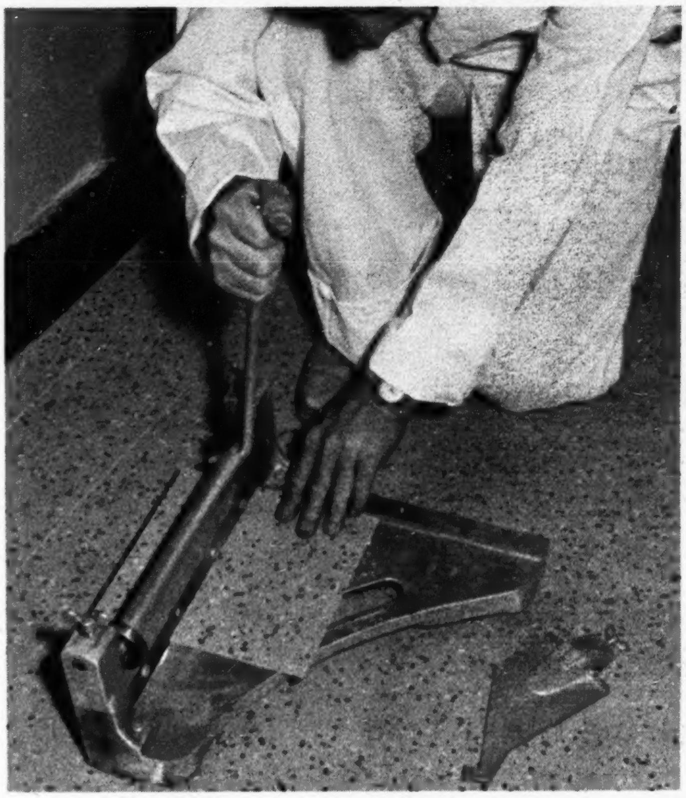


Fig. 36. Cutting with a tile cutter

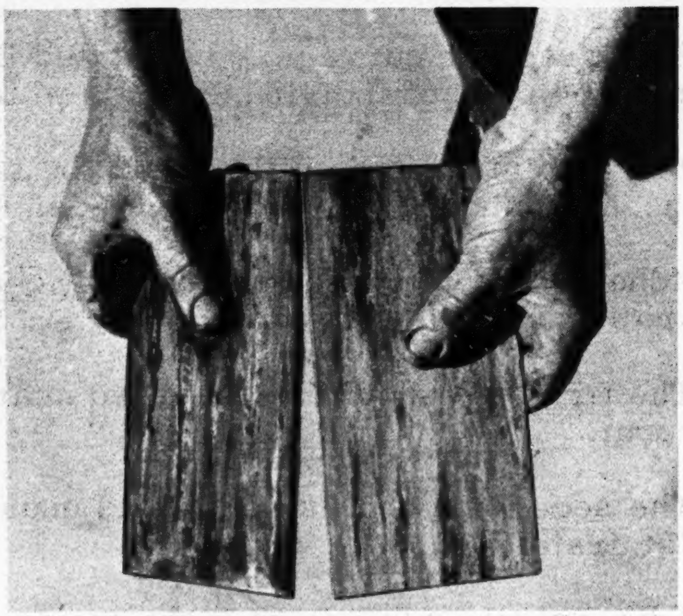


Fig. 37. Breaking tile

If the irregularity of the wall is such that angles or contours occur within the width of one tile, it may be necessary to heat the tile and cut it with snips or a utility knife.

The cut edge of the tile is always fitted against the wall so that irregularities in the cut edge are inconspicuous.

Checkup

A greater amount of adhesive is required on a dense concrete floor than on a wood floor. 1. T F

Asphalt tile requires slightly more adhesive than vinyl-asbestos tile. 2. T F

The entire "field" is laid two rows at a time. 3. T F

On an asphalt tile installation, the installer works from the uncovered floor. 4. T F

Adhesive is spread so that the entire floor area is covered. 5. T F

A skilled installer is able to make all required cuts with a tile cutter. 6. T F

The cut edge of any tile should be placed against the field. 7. T F

Any irregular curve may be plotted if there are a sufficient number of individual points which can be connected. 8. T F

The adjoining border tile should be set in place before those around a door jamb have been fitted. 9. T F

Adhesive should be spread so that chalk lines on the floor are left uncovered. 10. T F

The first tile should be installed near the center of the room. 11. T F

The second step in laying tile is usually referred to as "stairstepping." 12. T F

Adjacent tile are laid at right angles to each other in order to achieve a basketweave pattern. 13. T F

For diagonal cuts, the edge of the measuring tile is held firmly against the wall surface. 14. T F

In scribing to an irregular surface, the installer slides the measuring tile along the wall but positions the border tile over the adjacent field tile. 15. T F

TOPIC 4— DIAGONAL INSTALLATION

Introduction

- How does diagonal installation differ from square installation?
- Why are special templates sometimes needed to scribe tile for diagonal installation?
- Of what materials may these templates be made?

When tile is cut for a diagonal installation, some special problems are encountered. For the most part, however, the laying procedure is much the same as for square installations.

Related Information

Along straight walls and other vertical surfaces where a snug fit is not required, since moulding or coving will cover the edges of the tile, the border width may be measured and the diagonal attachment on a tile cutter set for the correct width. The tile may be cut without first being measured individually.

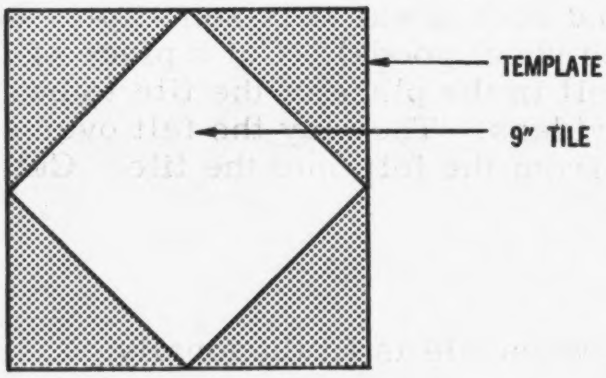


Fig. 38. Making a tile template for diagonal layout

If a tile cutter is not available, or if a tighter fitting border is required, a template made of sheet metal or heavy cardboard may be used (Fig. 38). The template should be square, with side dimensions equal to the diagonal measurement of the tile being laid. For 9" × 9" tile, for example, the template should be approximately 12-3/4" square. Place the border tile in the same position for scribing as with square layout, and move the template along the wall as a guide for the scoring lines (Fig. 39). Then cut the tile, either by snapping along scoring lines, cutting with a knife, or cutting with a tile cutter if one is available.

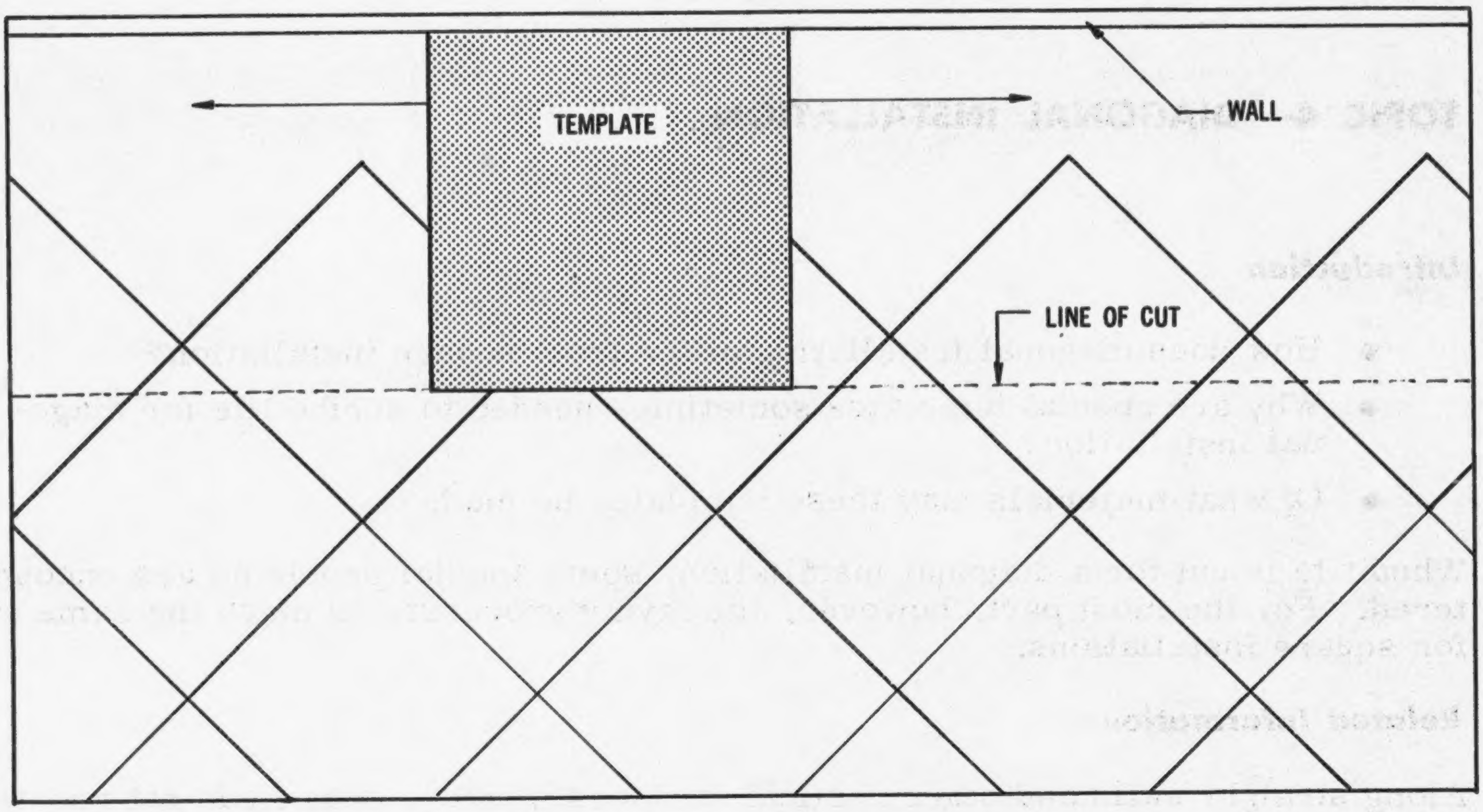


Fig. 39. Using a template

The odd angles produced around doorways are often difficult to fit when tile is laid diagonally. Around such areas it is sometimes better to use a lining felt pattern (as is done with sheet goods). Cut a piece of felt the size of the tile being used. Lay the felt in the place of the tile to be installed and mark each angle with a pair of dividers. Then lay the felt over a piece of tile and carefully trace each mark from the felt onto the tile. Cut the tile according to the markings.

Checkup

A template is valuable when tile is fit diagonally. 1. T F

A tile cutter with a diagonal gauge should be used whenever a tight fit is required. 2. T F

A 12-3/4" template is used when scribing 9" × 9" tile. 3. T F

A felt pattern is required when fitting tile to walls and most other vertical surfaces. 4. T F

The size of the template is determined by the width of the border. 5. T F

TOPIC 5— WET-LAYING PROCEDURES

Introduction

- How does radiant heating affect wet-laying?
- What are the fastest-drying cements of those commonly used?
- Why is the dry-cutting of border tile recommended in wet-laying work?
- Where does the installation start in wet-laying?

Many factors must be considered before installing tile on wet adhesives. The first factor to be considered is the time alloted for the adhesive to develop a "live bond," which means that the adhesive will adhere to the floor and to the tile before it dries. Another factor to consider is that the amount of adhesive to be spread is controlled by the depth of the trowel teeth. Certain types of tile require less adhesive than other types, especially when wet-laid. If more adhesive is used than necessary, it will bleed through the seams of the tile, causing extra cleanup work. Consideration must also be given to the area to be spread at one time; the correct area depends upon the drying time of the adhesive. Today, with the large variety of tiles and adhesives manufactured, the installer must be familiar with these considerations before proceeding with any installation.

Consideration should be given to grade level before spreading an adhesive to make sure the installer has the adhesive specified by the tile manufacturer for that level.

Related Information

Adhesive drying time. Adhesives generally used for wet-laying are epoxies, waterproof adhesives, rubber or latex base adhesives, and linoleum paste. The area to be spread at one time with each is limited to the amount of tile that can be laid before bonding effectiveness is lost. If the floor has radiant heat, setting time is accelerated.

Drying times of all types of adhesives vary with the ventilation and temperature conditions. Waterproof adhesives have a rapid setting time, and most rubber or latex base adhesives have a much shorter setting time than any other adhesives. In any case, the manufacturer's recommendations should be followed.

Application of materials. The following two paragraphs are reprinted from Congoleum-Nairn "Installation Specifications":*

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*Technical Service Bulletin, Congoleum-Nairn, Inc., May,1961 (A. I. A. File 23g).

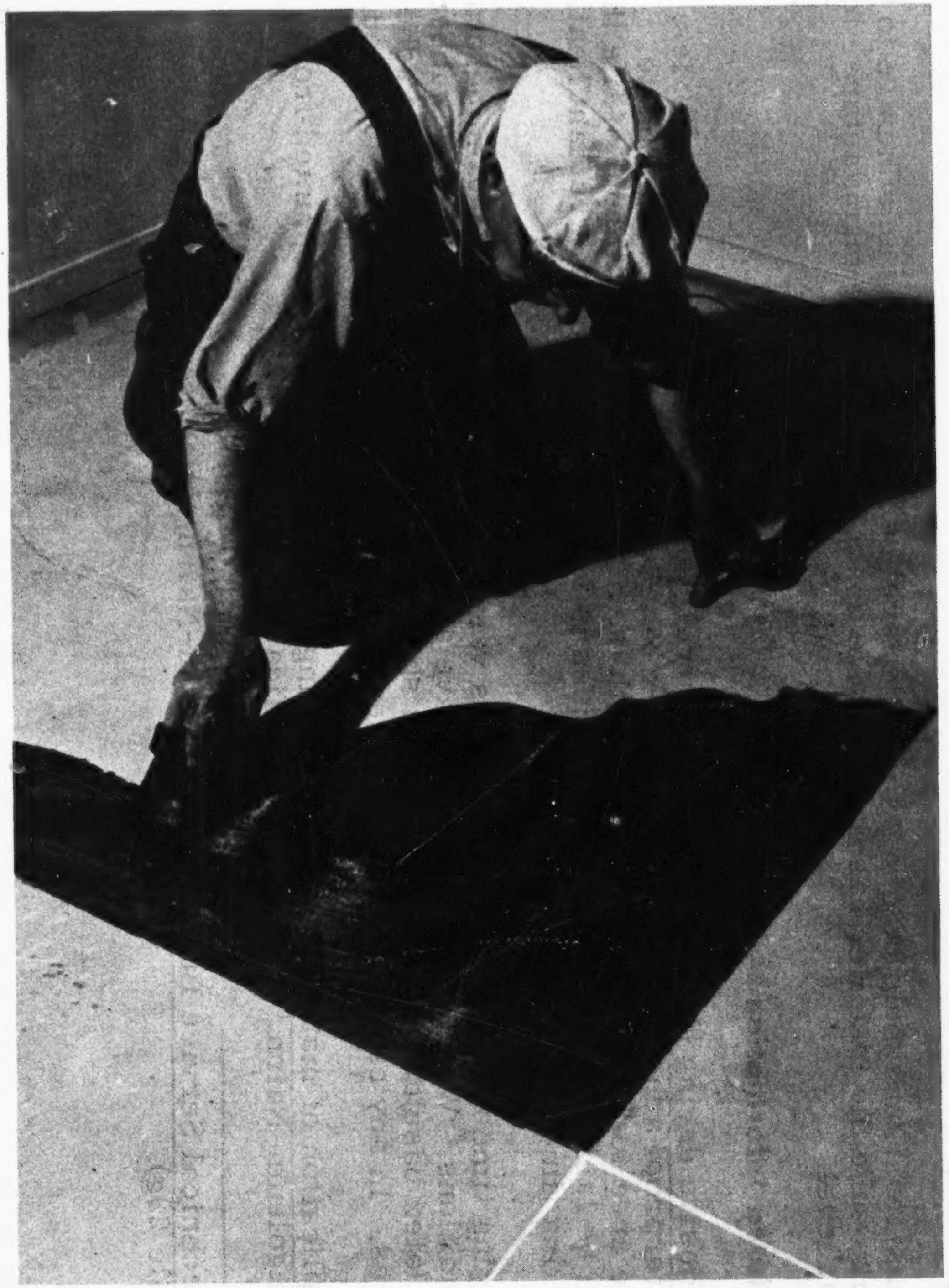


Fig. 40. Spreading adhesive to chalk line

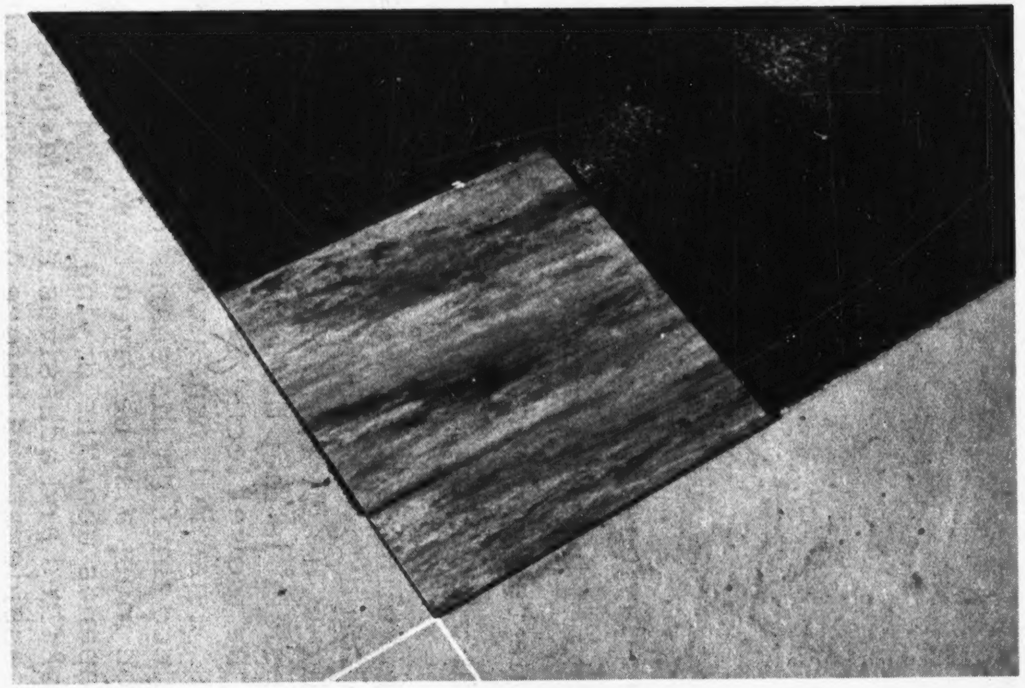


Fig. 41. Fitting of first tile

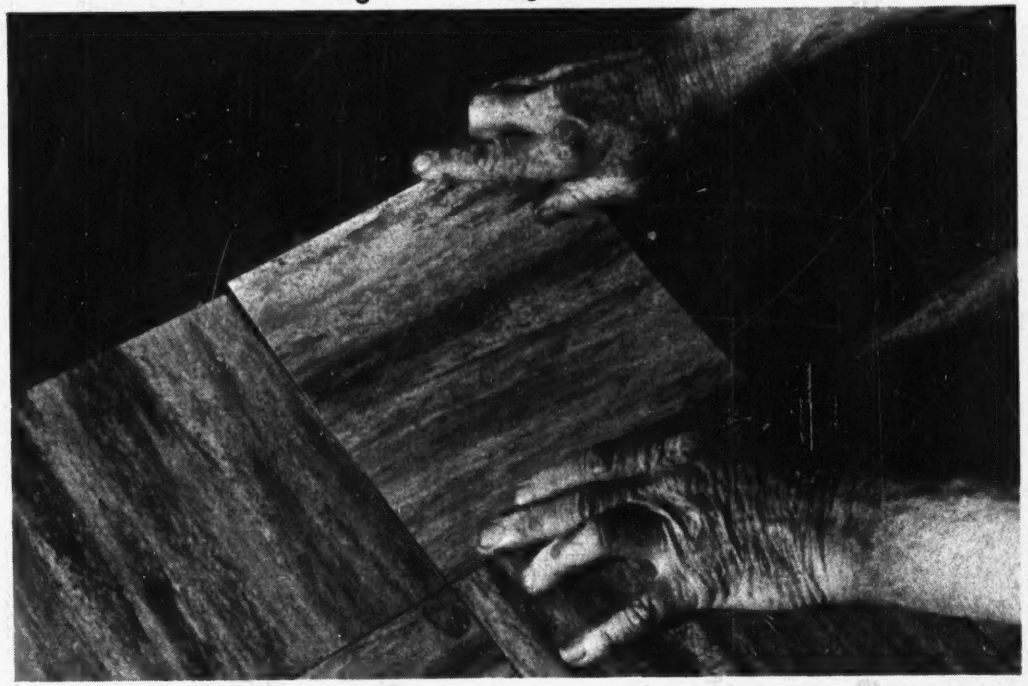


Fig. 42. Laying succeeding tiles

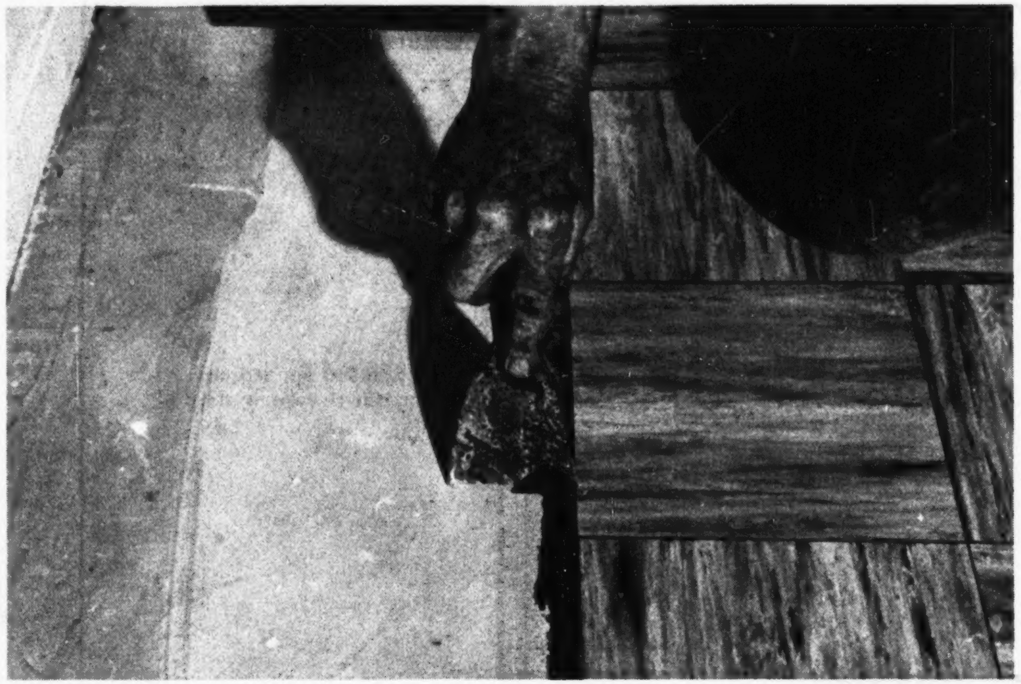


Fig. 43. Removing excess adhesive

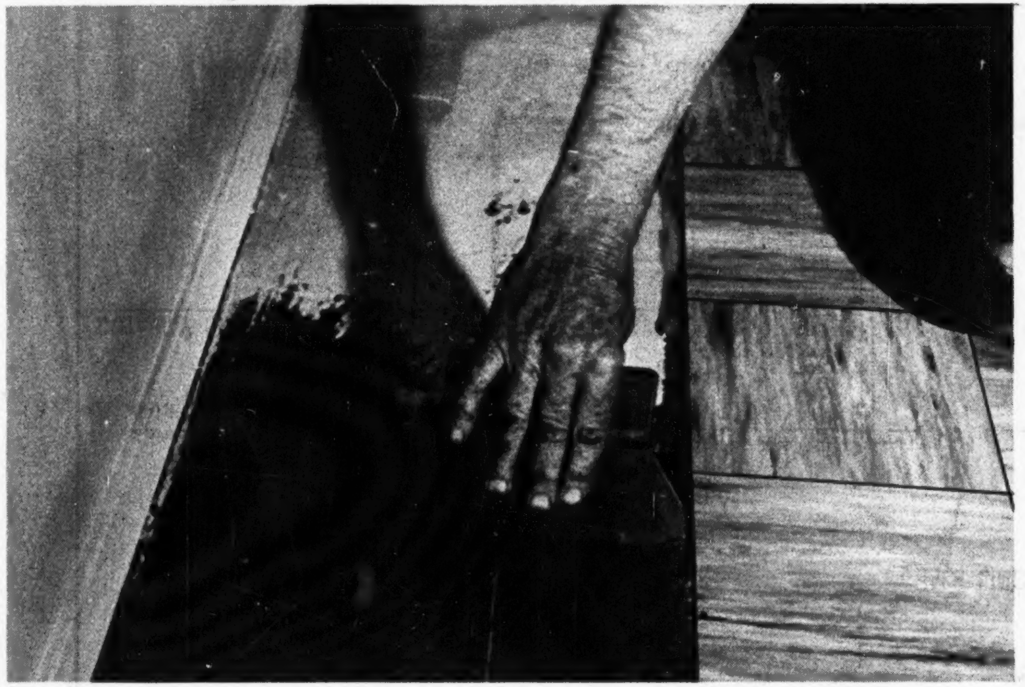


Fig. 44. Spreading for last two rows

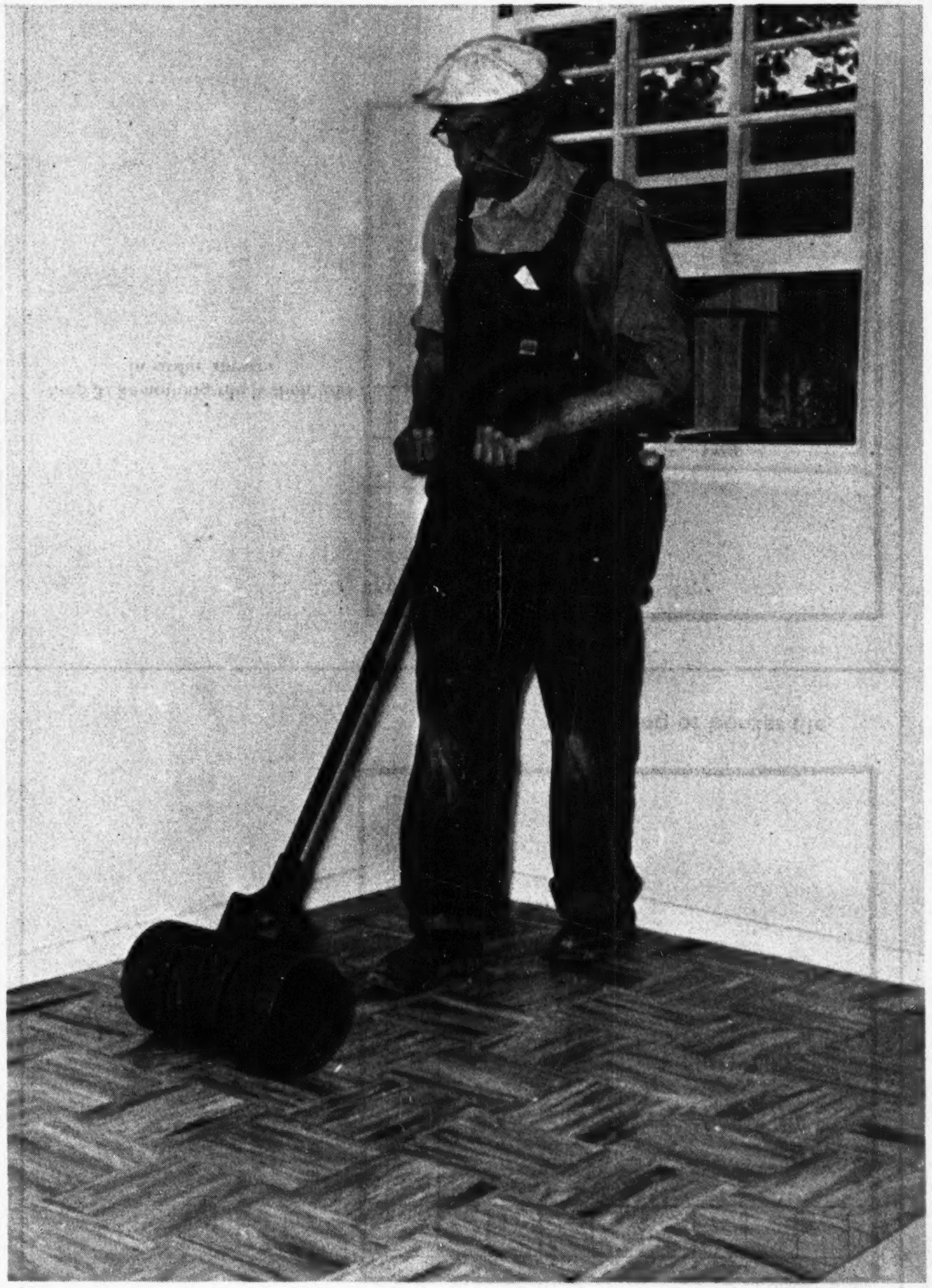
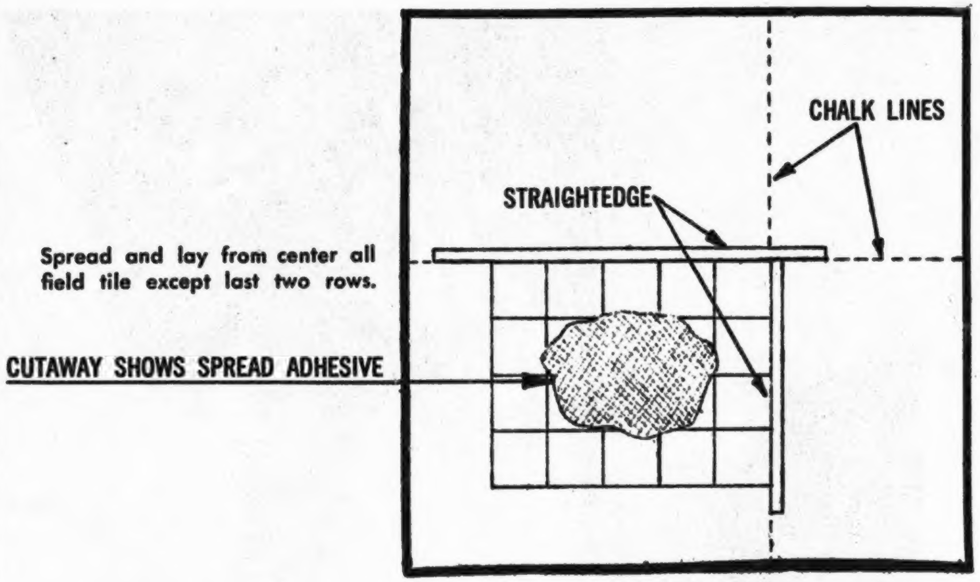
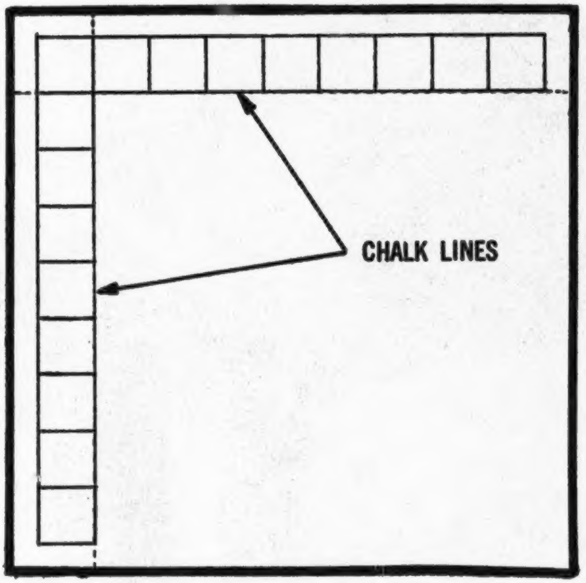


Fig. 45. Rolling finished job


CHALK LINES
STRAIGHTEDGE
CUTAWAY SHOWS SPREAD ADHESIVE

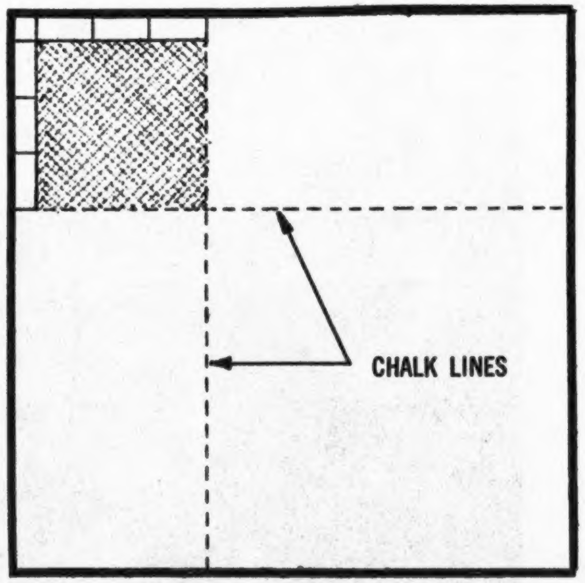
Spread and lay from center all field tile except last two rows.

Fig. 46. Typical method of laying field tile


CHALK LINES

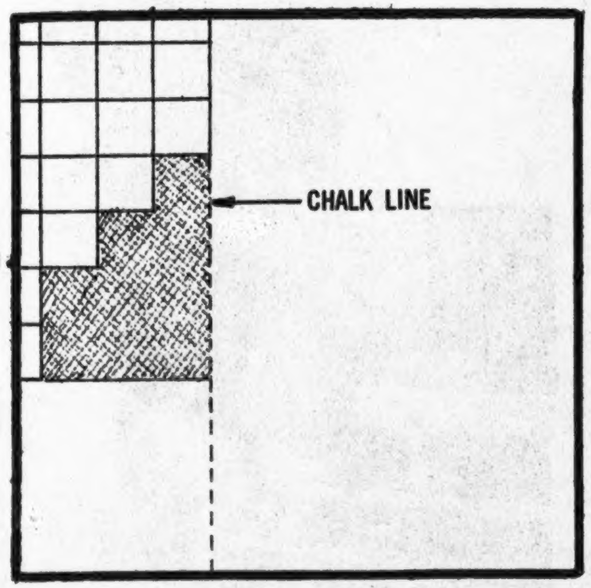
Step 1: Dry-laid tile to be scribed to vertical surfaces is then cut and removed.

Fig. 47. Dry-laying of border tile


CHALK LINES

Step 2: Area is spread and border tile put in place.

Fig. 48. Spreading and laying border tile



Step 3: Remaining tile is then laid in order shown.

Fig. 49. Laying field tile

Start at the established guide lines and spread an area as far as the arm can reach. Embed the tiles into the adhesive immediately. Each tile shall be properly fitted against the preceding tiles and shall not be forced into tight contact but merely allowed to drop in place. Care must be taken to see that all four edges of each tile are firmly in contact with the adhesive. Care shall be used to maintain right angle lines in laying the tiles. The installer shall work from the uncovered floor as much as possible until the adhesives has set up enough to hold the tiles from sliding out of alignment. When necessary to walk or kneel on the newly installed tiles make certain that alignment has not been changed.

As soon as the adhesive has set so that it will not come up between the joints, the surface shall be rolled in both directions with a 150 pound roller to assure contact of the tiles and adhesive and to bring the edges of the tile flush. At junction with vertical surfaces the tiles shall be scribed carefully so as to form a neat joint at these points. The tiles shall never be forced into place or laid under pressure.

Sequence of application. Either one of the two sequences may be used in wet-laying tile. In the first, and preferred, method (Fig. 46), use a straightedge anchored to the floor at the starting point, generally near the center of the room. Spread adhesive and lay the field tile only, leaving the last two rows of tile next to the vertical surfaces unpasted. Clean any edges showing excess paste. Proceed to lay the next row of tile dry, butting the field tile. Scribe this row of tile to fit the vertical surfaces. Cut, remove, paste, and lay the last two rows of tile, completing the installation. If the border tile is too difficult to scribe to the vertical surfaces, use a lining felt pattern as for diagonal tile or sheet goods.

In the alternate method, laying is started with the border tile before adhesive has been spread. Fit the border tile to the vertical surface and dry-cut them. Remove the tile and spread an appropriate area with adhesive. Lay the tile in this area, starting with the border tile and being sure all tile are square with the layout lines (Figs. 47, 48, 49). Proceed in the same way around the room.

Make as many dry cuts of nonfield tile as possible, thus minimizing the amount of adhesive that gets on the hands and the tile. This will reduce cleaning time when the installation is completed.

Checkup

"Wet-laying" means laying tile while the adhesive is still wet. 1. T F

Radiant heating in a floor extends the working time of adhesives. 2. T F

Adhesive drying time is an important factor to be considered in making a wet-laying installation. 3. T F

The fastest drying type of adhesive is waterproof cement. 4. T F

When being laid, the tiles must be forced tightly together. 5. T F

Wet-laid tile floors must be rolled in both directions. 6. T F

For best results, the installer should work from the uncovered portion of the floor whenever possible. 7. T F

The preferred depth and spacing of trowel notching is related to the room temperature of the area being spread. 8. T F

Kneeling or walking on installed tile prior to rolling may cause shrinkage. 9. T F

The chief reason for dry-cutting the border tile is to avoid excessive cleanup. 10. T F

The amount of adhesive required is determined by the kind of tile used. 11. T F

The installer should press the tile firmly into the adhesive. 12. T F

The border tile must be placed last in wet-laying procedure. 13. T F

In the usual (and preferred) method of wet-laying tile, the center lines of the room are used to set the squareness of the layout. 14. T F

Even when border tile are laid out first, the border area is the last spread with adhesive. 15. T F unit F

SHEET GOODS

The installation of sheet goods accounts for up to 80 percent of the floor covering business. Ever since the early development of linoleum, which marked the beginning of the trade as we know it today, sheet goods has played a leading role in the industry. The subsequent development of modern materials in sheet form, especially the family of vinyls, has kept pace with the demand and, to a large degree, opened up new avenues for increased sales.

As the variety of sheet materials has expanded and the quality of the goods has improved, so, too, has the need for special skills been increased to meet the demands of this competitive business.

This unit deals primarily with the proper handling, laying out, and installation of sheet materials and the skills required to perform a workmanlike job.

TOPIC 1— HANDLING SHEET GOODS

Introduction

- **In what grades are sheet goods supplied?**
- **What precautions should be taken in shop cutting to prevent excessive waste?**
- **At what average temperature should sheet material be stored previous to laying?**
- **Why are dollies and hand trucks essential on a job site after delivery of material?**

The proper handling of sheet goods as they are shipped from factory to wholesaler to shop, and carried from shop to job, can save much needless expense by preventing waste of material and possible customer complaints.

While the installer may not often be called upon to handle packaged sheet goods apart from the job area in which he is working, a knowledge of the dangers and the procedures involved will help him to handle them more efficiently on the job.

Related Information

Grades. After manufacture, sheet goods are packaged in rolls, most of which contain about 60 square yards per roll. Before shipment, sheet goods are rolled out on a large table, inspected and graded, wrapped, labeled, and weighed. The label on each roll shows the pattern number, yardage, grade, and code. The code number is based on the month and year of manufacture and the roll number. This code number is also placed on a small slip inside the roll to aid in identification of the roll in case of complaint.

Materials are priced according to their grade. The grades used by the manufacturers are as follows:

- **Perfects--A roll of perfects must contain not less than 30 square yards and usually contains 60 to 64 square yards. Material in perfect rolls must be in one piece and free from imperfections which could adversely affect the appearance or wearing qualities of the material.**
- **Seconds--Seconds are one-piece rolls of not less than 40 square yards. The sheet goods must contain no defects serious enough to affect the product materially.**
- **Remnants--Remnant rolls contain two to six pieces of one pattern; no piece is smaller than six square yards, none larger than 20 square yards. Pieces are not always perfectly matched in shade.**

- Cuttings--Cuttings are imperfect material in pieces of from two to six square yards.

General handling precautions. Sheet goods should never be transported or stored in any position but on end, and a roll should always be secured to prevent any movement. To speed handling, handlers of heavy freight use cranes or winches to hoist the material from truck, train, or boat. Care must be exercised at all times by the freight handler because sheet goods can be damaged easily while still inside the wrapper. Serious damage can occur to sheet goods, particularly to linoleum, if the roll is dropped on its side. Sheet vinyls will not crack as easily as linoleum unless the weather is especially cold, but they never should be dropped, regardless.

Handling by retailers and wholesalers. The wholesaler will be held responsible for checking the rolls for possible damage to the goods. If the sheet goods are delivered to the retailer direct from the transportation company, the retailer should examine the bill of lading to see that he receives all the rolls recorded and check each roll carefully for possible damage. The workman should look at the end of the rolls to see if any cracks show along the edge from the paper core outward. A roll of sheet goods dropped at a certain angle can be cracked about every 12 to 18 inches, as far as halfway through the roll. The workman should also check the wrapper on each roll to see if it has been cut or torn and inspect the surface of the wrapper for deep cuts or scratches.

A single workman, if he is without additional help, can lower the roll from a truck to a rubber mat made for freight handling. However, it is much safer if three men work together to lower the roll to ground level.

The sheet goods delivered from the transportation company or the wholesaler should be stored on end in the retailer's establishment.

Cutting material in the shop. Cuts made in the shop must be square across the material; otherwise the measurement could be short by a considerable margin, depending on how far the cut was out of square. Using a two-foot carpenter's square applied against a six-foot steel straightedge is one method of cutting to be sure the material is cut square with the edge of the roll. Line up the square perfectly on the factory edge of the roll, then place the straightedge against that part of the square lying on the back of the material. Then cut on the back of the material across the six-foot sheet with a linoleum knife held against the straightedge, which is held firmly against the square.

Efficiency in the cutting of material is such an important item that some shops have one man do all the cutting. In cutting material, the installer should be careful not to waste any more than necessary. Accurate cutting of material can prove to be especially valuable on a large job. Because of variations in room sizes, odd pieces left from previous cuts can sometimes be used profitably.

Delivery of rolls to job site. While material is being transported to a job, the surface should be well protected against damage.

After the material arrives at the job, the installer in charge determines the number of rolls to be placed on each floor, specifying their approximate total yardage. He may require a hoist in order to put the rolls where he wants them if, as is so often the case in new construction, no elevators are available. Hoisting must be done carefully so that the surface of the goods is not hit or the wrapping broken. Sheet goods should never be dropped to the floor from a vertical position. Instead, the installer can use a regular linoleum truck, or place a roll of lining felt or several sandbags next to the vertical roll, and lower it gently to the floor. Laying sheet goods can be greatly simplified by using dollies and trucks. In addition to their labor-saving value in the handling of goods, dollies and trucks are extremely helpful in moving refrigerators and other heavy fixtures and appliances, which is often found necessary on a floor covering job.

Placing sheet goods. Sheet goods are affected by temperature. (Sheet vinyls are even more susceptible to cold than is linoleum.) Before they are laid, sheet goods must be stored for at least 24 hours in a room kept at a temperature of about 70° F. If possible, the handling can then be done in this room also.

Sheet goods are unrolled on the floor, face down. To turn the strip over without scratching the surface, the installer starts at one end and folds the material so that one end is over the other at the edge of the room, leaving a loop in the center of the room. He then doubles the loop back toward the ends. As he approaches the ends, the bottom end will pop out, and he can then slide the goods over to the opposite wall, face up.

Special dollies now available from many manufacturers allow the installer to cut the material easily face up and to roll up the remaining piece.

Checkup

The amount of material contained in most full rolls of sheet goods is about ____1____.
1. ____________

Sheet goods containing not less than 30 square yards in one piece and free from imperfections are graded as ____2____.
2. ____________

Sheet goods should always be stored or carried on ____3____.
3. ____________

When sheet goods are cut in the shop, it is important for the cut to be ____4____.
4. ____________

Remnant rolls of sheet goods contain pieces not perfectly matched in ____5____.
5. ____________

Crated or uncrated sheet goods should never be dropped to the floor from a(n) ____6____ position. The best way to lower it is to use a(n) ____7____ ____8____.
6. ____________
7. ____________
8. ____________

To be in perfect condition for installation, sheet goods should be stored for 24 hours at a temperature of about ____9____.
9. ____________

The pieces in a roll of cuttings usually contain from ___10___ to ___11___.
10. ________
11. ________

It is particularly dangerous to drop a roll of sheet goods in ___12___ weather.
12. ________

The tools used to line up a cut made in the shop are the ___13___ ___14___ and a(n) ___15___.
13. ________
14. ________
15. ________

Sheet goods are unrolled ___16___ down.
16. ________

Efficient use of material depends on accurate ___17___.
17. ________

The small slip inside a roll of sheet goods contains the ___18___ number.
18. ________

Remnant rolls of sheet goods contain various lengths and usually contain how many pieces?
19. ________

How many men should work together to lower a crate of linoleum to the ground from the delivery truck?
20. ________

TOPIC 2– LAYING OUT MEASUREMENTS

Introduction

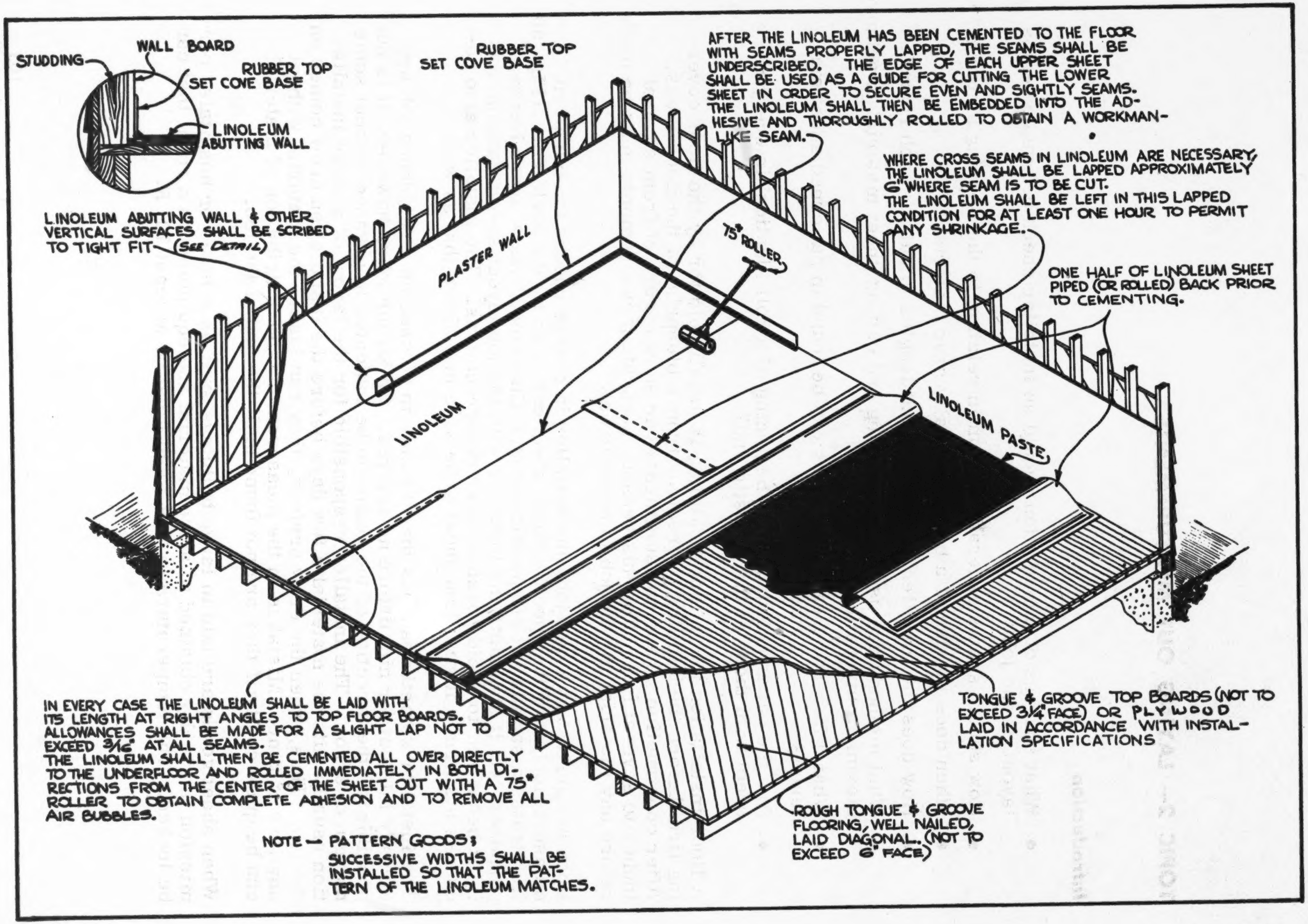
- What sources of information should an installer check before he begins layout on the job?
- How should seams generally be run in relation to the flooring material?
- When does the use of a border actually save material?
- How does the installer determine what lengths to cut for each room?
- What methods are used in measuring and cutting sheet material to achieve maximum utilization?
- What different repeat dimensions can be found in patterned sheet materials?
- Are the patterns found at the beginning of a roll identical in every respect with those at the opposite end?

A floor installation job in a new building is usually bid for by the floor covering firm before the building is erected, from a blueprint of the floor areas. After construction, these measurements can show errors of from several inches to several feet. For this reason, accurate measurements must be made before any material for the job is actually cut.

Upon his arrival at a new job, the installer in charge checks the blueprint measurements and the specifications sheet drawn up by the architect. (Fig. 50 illustrates a sample set of specifications.) Checking these sources has two purposes: (1) it acquaints the installer with the job layout specifications; and (2) it helps him to avoid possible later disagreements. The installer also rechecks his firm's instruction sheet to be sure he follows that as well.

The installer sometimes finds that the cuts to be used on a residence job are already laid out for him before he arrives. On larger jobs, however, it is not possible for the direction of the seams to be indicated in advance without some margin of error. The installer responsible for the layout of a large installation usually cuts the material a few days before the installation crew comes on the job. Thus, when the crew arrives, they can install the material without any loss of time. Mistakes in the measurement and distribution of material can be quite costly if they are not found until the end of the job.

When sheet goods are laid in large buildings such as schools or hospitals, permission is usually obtained to store material and equipment in a room that can be locked. The temperature in this room must be at least 70° F.



LINOLEUM ABUTTING WALL & OTHER VERTICAL SURFACES SHALL BE SCRIBED TO TIGHT FIT (SEE DETAIL)

AFTER THE LINOLEUM HAS BEEN CEMENTED TO THE FLOOR WITH SEAMS PROPERLY LAPPED, THE SEAMS SHALL BE UNDERSCRIBED. THE EDGE OF EACH UPPER SHEET SHALL BE USED AS A GUIDE FOR CUTTING THE LOWER SHEET IN ORDER TO SECURE EVEN AND SIGHTLY SEAMS. THE LINOLEUM SHALL THEN BE EMBEDDED INTO THE ADHESIVE AND THOROUGHLY ROLLED TO OBTAIN A WORKMANLIKE SEAM.

WHERE CROSS SEAMS IN LINOLEUM ARE NECESSARY, THE LINOLEUM SHALL BE LAPPED APPROXIMATELY 6" WHERE SEAM IS TO BE CUT.
THE LINOLEUM SHALL BE LEFT IN THIS LAPPED CONDITION FOR AT LEAST ONE HOUR TO PERMIT ANY SHRINKAGE.

ONE HALF OF LINOLEUM SHEET PIPED (OR ROLLED) BACK PRIOR TO CEMENTING.

IN EVERY CASE THE LINOLEUM SHALL BE LAID WITH ITS LENGTH AT RIGHT ANGLES TO TOP FLOOR BOARDS. ALLOWANCES SHALL BE MADE FOR A SLIGHT LAP NOT TO EXCEED 3/16" AT ALL SEAMS.
THE LINOLEUM SHALL THEN BE CEMENTED ALL OVER DIRECTLY TO THE UNDERFLOOR AND ROLLED IMMEDIATELY IN BOTH DIRECTIONS FROM THE CENTER OF THE SHEET OUT WITH A 75# ROLLER TO OBTAIN COMPLETE ADHESION AND TO REMOVE ALL AIR BUBBLES.

NOTE — PATTERN GOODS;
SUCCESSIVE WIDTHS SHALL BE INSTALLED SO THAT THE PATTERN OF THE LINOLEUM MATCHES.

TONGUE & GROOVE TOP BOARDS (NOT TO EXCEED 3¼" FACE) OR PLYWOOD LAID IN ACCORDANCE WITH INSTALLATION SPECIFICATIONS

ROUGH TONGUE & GROOVE FLOORING, WELL NAILED, LAID DIAGONAL. (NOT TO EXCEED 6" FACE)

Fig. 50. Installation specifications for linoleum on suspended double-wood subfloors

Related Information

Planning the Layout

Seams. The first decision to be made is where the seams are to go. Best results are obtained on wood floors by laying the sheet goods (and lining felt, if used) so that the seams will run across the floor boards. On installations where seams have to run in the same direction as the floor boards, the installer can protect the seams with strips of a fabric seam protector.

If the floor boards in two adjoining rooms run in opposite directions, the installer must plan the job so that no seam falls directly over the meeting point of the two floors.

The location of cross seams in a center position on floors that have standard columns can help make a better-looking installation. The cross seams enable the installer to fit his material more tightly to the columns, where it is always difficult to obtain a perfect fit.

Fitting material. Many considerations apply when the fit of the material is planned, depending on the shape and size of the rooms and the type of material used. As the man in charge of a job, the installer should keep two rules in mind: use all the material in as large pieces as possible, and avoid damaging any material that can be used at all.

Some examples of fitting considerations are as follows:

- One way of saving material in rooms that are only slightly wider than 6, 12, or 18 feet (or other multiples of the standard sheet goods width) is to use a border, which makes it unnecessary to cut up a full sheet of material merely to cover a few inches.

- If the most prominent wall of a room is angled (in relation to the opposite wall) and has a doorway in it, and if the opposite wall does not also have a doorway, the installer should start laying the sheet goods at the angled wall with a full 6-foot width and continue laying full strips all the way across the room. This leaves a wedge-shaped area to be covered when he reaches the opposite wall; this piece can be fitted by scribing. However, this wedge-shaped piece cannot be laid along a wall that has a doorway; since the floor in front of a door always receives the greatest wear, seams should be kept away from this area.

- When a border is to be installed in a room of irregular shape, it should be equal width all around, parallel with the walls. This means that the edges of the field are also parallel with the walls.

- The installer may find that remnants are among the rolls to be delivered for the job. A knowledge of the construction of the rooms involved in the job will enable him to determine where these pieces can be used to best advantage. Because remnant pieces are from different mixes of goods, the shades sometimes vary, requiring the shifting of these pieces to locations where they will be least noticeable.

- Plain goods or goods with a nondirectional pattern are much easier to lay out than patterned goods. Patterned goods must be matched carefully and usually require more material.

Room Measurement

Keeping all these considerations in mind, the installer measures all the rooms in the job to determine exactly how much material each will require. Since the installer has to keep accurate records of the location of each room and its measurements, he carries a notebook in which to record the measurements and a marking crayon to mark the floor of each room for easy identification. He refers to this notebook constantly from the time the first measurement is taken until the job is completed.

Widths. The first step in measurement of a room is to determine how many widths of the material will fit into the room. Start to measure by stretching a tape across the room to determine the number of 6-foot pieces required. Since sheet goods are usually wider than 6 feet by a fraction of an inch, measuring for 6-foot widths results in sufficient allowance for excess from which to cut the seams after the material is cemented.

With the tape still stretched out, mark each 6-foot width with a crayon line on the floor 3 or 4 inches long, so that the seam locations will be obvious at a glance from then on. These lines also help to make it clear whether projections and partitions will give difficulty. In order to measure widths accurately when there are projections or partitions, it may be necessary to measure from the centers of doorways.

Visualizing how the finished job will look can be of help in making many decisions on the layout of widths.

Lengths. Once the number of lengths in the room and the approximate locations for seams are known, the next step is to measure the lengths needed. Allow about 1 inch extra on each length measurement, unless the wall is very irregular; in that case make an additional allowance of 1/2 inch to 3/4 inch. Mark the measurement for each length in feet and inches along the wall line, and write each measurement in the notebook, identifying it exactly so that the material can be marked accordingly.

Borders and coving. If the coving or border is a different color from the field, it has usually been estimated previously by the salesman. However, check the total footage to be installed to make sure there will be no shortage of material. In figuring for the border or coving, figure on the basis of using miter joints, which require overlapping the two pieces and thus use more material. Computing this way is advisable even though butt joints, requiring less material, may be used instead. Follow all the outlines of walls, cupboards, and other projections in laying out a border.

In computing the amount of cove material needed for separate coving, a simple rule is to allow the same amount for height against the wall as the material will run out from the base. This is usually 4 to 6 inches, most commonly 4 inches. With an allowance for trimming, 10 inches is usually figured as the total width.

First determine the longest piece of base needed in one piece. If the longest piece is 10 feet, for example, it can usually be assumed that a piece of 6-foot material 10 feet long should be sufficient to cut all the border. If several rooms are being done this way at once, convert the 6 feet into 72 inches and divide this figure by the cove width of 10 inches. This will give the number of 10-foot pieces that can be cut from that one sheet of material. Shorter pieces can be cut from that piece also, of course.

If a separate piece is to be used for border or coving, but the material in the coving or border is the same as the field material, the installer computes the amount of material needed for this at the same time he computes for the field. If he waits until the field is laid and cut back from the wall, he may have to use far more material for this purpose than he would if he had included it in his original planning. Sometimes he can use one piece of sheet goods to cut all the border or cove.

Measurement of Materials

The next step is to measure the rolls of material to determine their exact lengths and the sizes of remnant pieces.

Remnants. The remnants are usually measured first. Even though the length measurements of remnants in rolls are usually indicated on the roll, open each roll, piece by piece, marking each piece and recording the measurement in the notebook. Roll each piece up after it has been measured and marked, finish side facing out. Stand each roll on end with the measurement mark on the top inside edge so that it can be checked at a glance.

Full rolls. Next check the full rolls for length, calculating in feet and inches rather than in yards. Usually a roll runs a few inches longer than indicated by the square yardage marked on the roll.

A simple procedure for calculating the linear footage of rolls of material 6 feet wide is to divide the total number of square yards marked on the wrapper by two. Add the resulting amount to the square yardage figure. This gives the number of linear feet in the roll. For example, if a roll contains 60 square yards, it also contains 90 linear feet. In calculating, proceed as follows:

$$60 \div 2 = 30$$
$$30 + 60 = 90$$

Some manufacturers indicate the measurements of a roll in tenths of a square yard to make it easy for the installer to compute. Each tenth of a square yard equals 1.8 linear inches.

Patterned goods.* The installer sometimes makes the mistake of failing to check the match of a piece of patterned sheet goods when figuring lengths.

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*Adapted from Installation Manual (Lancaster, Pa.: Armstrong Cork Co., 1962), p. 60.

Patterned materials require extra lengths of material and more care in layout because the elements of the design recur at regular intervals. Depending on the interval between identical design elements, the material is said to have a "repeat" of a certain dimension. Patterns over the length of the material are matched on 9", 18", 27", 36", or 54" repeats, of which the 18" repeat is the most widely used. The 9" and 18" repeats usually occur in small block or tile effects.

Repeats also occur across the material's width, spaced 18", 36", or 72" apart. These "cross repeats" are an installation factor only in cases where a 6-foot width can be split into two 3-foot strips (in a 14'9" × 14'9" room, for instance) to make a cross seam that matches the length.

Cutting Materials

The final step before installation is cutting the material. Try to work in a place that allows ample room for laying out the longest length of material and cutting it on the floor. Sometimes a large vacant room is available for this purpose; sometimes a smooth driveway will be a good place to work. In any case, however, be sure that the temperature of the cutting area is high enough (70° F) to prevent the material from becoming brittle. Cold sheet goods are apt to break knife points.

The cuts to be made are measured with a 50-foot cloth tape. A simple method of handling the tape on a wood floor when working alone is to use an awl or a common icepick to hold the ring end of the tape.

Always try to use up partial rolls where possible, to save the firm money by using all material efficiently. If more than one partial roll is available, decide which one contains the most appropriate lengths for each cut. Draw from the remnants as often as possible so as to avoid having too many of them on hand. Remember that seldom is it possible to use to advantage a piece of material 6 feet wide if it is less than 24 inches long, except possibly for a small counter top.

A full roll should never be cut into until it is known where all pieces are going to be used without waste. Work cautiously, noting where each piece will be used and keeping track of the pieces remaining. As each piece is cut, label it and check it off in the notebook.

A good policy is to leave two or three rolls uncut until the cutting is well along, to allow for any damage that may show up. Damages occurring in shipment may not be discovered until the roll has been opened and measured.

When unrolling material for cutting, be careful when approaching the inside end. This end is wrapped around the core of the roll and can be very curly. For that reason, it is very often convenient to use as coving.

In cutting patterned material, it is occasionally found that the repeats in a strip cut from the end of a roll do not exactly match the repeats in a strip cut from the center of the roll. The material at the ends of a roll sometimes stretches slightly more than the material at the center. Therefore, before cutting the second strip from the roll, lay the first strip alongside the roll to determine if the repeats match. If they do not, unroll the whole roll and cut the second strip from the inside end of the roll. The two strips should then match exactly.

After the lengths have been cut, store one roll against the other to prevent their becoming unrolled. If rolls are tied to prevent unrolling, the twine will often cut the edge of the outer flap. This can be prevented by placing a piece of scrap or wrapping paper between the twine and the linoleum edge.

Checkup

On wood floors, the best results are obtained if sheet goods are laid so that the seams run parallel to the floorboards. 1. T F

Plain-colored and nondirectional pattern sheet goods are the easiest to lay out. 2. T F

Seams should be placed as close as possible to the front of a door. 3. T F

Cutting cold material increases the possibility of damage to the knife. 4. T F

On residence installations, a smooth area in which the installer can lay out goods for cutting is often the hallway. 5. T F

On floors with standard columns, cross seams should be located near the center. 6. T F

To measure widths accurately, the installer measures projections or partitions from the edges of the doorways. 7. T F

The installer allows approximately 1 inch extra on each length measurement that he takes. 8. T F

A cloth tape is preferred by most men in the trade for measuring sheet goods. 9. T F

An awl can be used to hold the ring end of the tape for measuring sheet goods on a wood floor. 10. T F

The installer figures patterned sheet goods to match by measuring the material the same length as the room. 11. T F

Rolls of remnants are opened last on any job because all the pieces are together. 12. T F

A 64-square-yard roll contains 96 linear feet. 13. T F

On a measure given on a roll of linoleum as 50.2 square yards, the .2 is equal to 3.6 linear inches. 14. T F

Miter joints are the most economical for borders or coving. 15. T F

Little use can be made of a full width of sheet goods that does not measure at least 2 lin. ft. in length. 16. T F

When laying out a border the installer may ignore the wall outlines, cupboard lines, and projections. 17. T F

An installer should leave two or three rolls uncut until the job is well along, as an allowance for possible damaged pieces. 18. T F

If the floor boards run in opposite directions in adjoining rooms, it will be necessary to have a seam at the meeting point of the two floors. 19. T F

In a wedge-shaped room, the shape of the field should be kept square. 20. T F

The pattern repeat most frequently encountered in linoleum is 18 inches. 21. T F

Slight variations in the repeat of the pattern often occur within a given roll of material. 22. T F

TOPIC 3—PLAIN OR NONDIRECTIONAL FIELDS

Assignment	Installation Manual, Armstrong Cork Co., Chaps. 7, 8, 9, and 10.

Introduction

- How extensively is lining felt used in modern installations?
- How are sheet goods fitted to the walls?
- What precautions should be observed when cross seams are required?
- How is material scribed to irregular surfaces?

Installation procedures for the various kinds of sheet goods are basically the same, but techniques vary because not all sheet goods can be handled the same way. For example, vinyls are adversely affected by heat and are also harder than linoleum. These variations in procedures are described in the assigned reference.

The basic procedures in making plain and nondirectional pattern field installations are: (1) laying lining felt (if it is used); (2) determining the lay of sheets (with nondirectional patterns); (3) scribing the field material; (4) applying adhesives; (5) making lengthwise seams and cross seams; and (6) fitting around obstructions.

Related Information

Lining Felt

Lining felt was formerly widely used under linoleum installed over wood floors. On commercial installations, a saturated felt was used as lining. However, this is seldom done today (except for tongue-and-groove floors), as other underlayments are more satisfactory.

Field Material

Patterns and colors.* If strips of nondirectional patterns are laid side-by-side just as they are cut from the roll, the mottling, graining, or spatter effect at the seams may produce a peaked or off-shade appearance. This can be avoided if the directions of the strips are reversed as they are installed.

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*Adapted from Installation Manual (Lancaster, Pa.: Armstrong Cork Co., 1962), p. 60.

In a room requiring five strips of linoleum, for example, pieces 1, 3, and 5 are laid exactly as cut from the roll; but pieces 2 and 4 are turned end for end, so that the mottling or graining continues across the seam from one piece into the other. In the case of sheet goods that are face trademarked along only one edge, matching is simplified by placing the two trademarked edges of adjoining pieces next to each other. However, adjoining pieces should always be checked visually for the best match, regardless of the reversing process.

Because sheet goods vary in shade, the installer should always check the two strips which are to be joined to form a cross seam to determine the amount of contrast in the shade of the two strips. To check the shade problem further it might be necessary for him to match the whole area before cutting in any strips in order to avoid objectionable adjacent shades in the placement of cross seams.

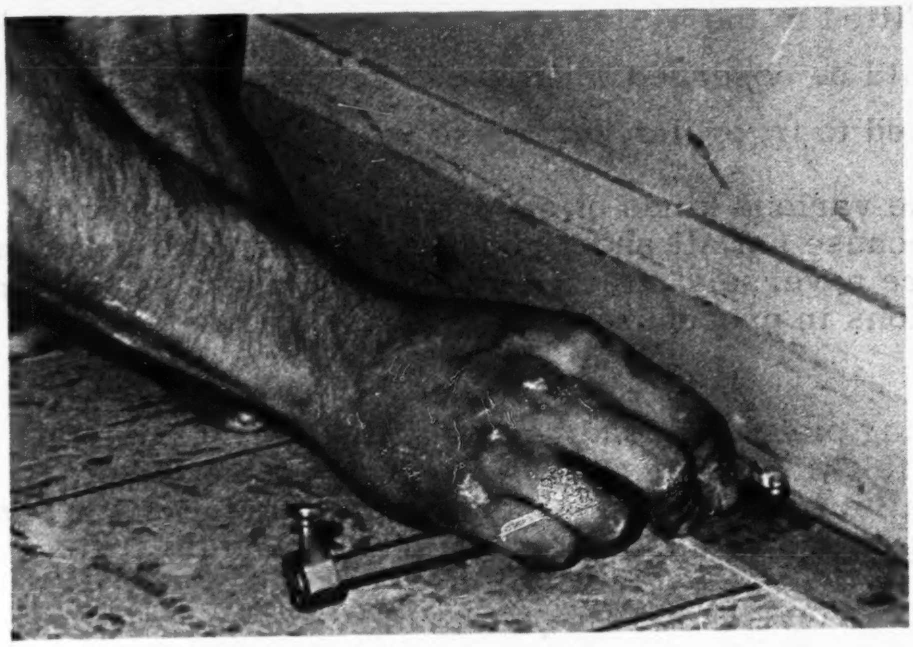

Fig. 51. Scribing linoleum along wall

Scribing. Place the first sheet of material on the floor approximately 1 inch from the wall on a straight line. Set the wall scriber so that one point is in firm contact with the wall at the floor line, and the other point rides on the surface of the material near the edge to be fitted.

Hold the scribing tool carefully at right angles to the edge of the goods. Draw it over the entire length of the piece to be fitted, leaving a visible line on the material, which reflects accurately any wall, door sill, and other irregularities. Cut the goods along this line and move the piece of goods against the wall, fitting it in place.

With the sheet fitted snugly against the side wall and the ends riding somewhat up over the baseboards, draw a line on the floor using the edge of the sheet as a guide. Then make a chalk or pencil mark on the sheet, extending it on to the floor. Fold the opposite end of the material back and draw the entire sheet away from the end wall until it lies flat on the floor, keeping the edge of the sheet true to the guide line on the floor.

Now set the wall scriber at the exact distance between the key marks on the underfloor and on the goods. Keeping the goods on the guide line, place one leg of the wall scriber firmly against the baseboard and, with the other leg pressed into the goods, draw a scribe line along the end of the sheet. When cut on this line, the material will fit solidly against the wall. Repeat this operation at the other end of the sheet, trimming as before, and then cut the first sheet to fit the three wall surfaces.

Special situations. Certain special situations such as borders and feature strips require special treatment of the field. Special procedures are explained in the topic covering these situations.

Applying Adhesives

The next step is spreading the adhesive. Fold one end of the sheet back on itself (called "lapping") and spread adhesive the full width of the sheet. Using a trowel producing a spread of about 14 square yards to the gallon is advisable if linoleum paste is used.

Lay the sheet back into the spread adhesive and repeat the same procedure with the other end. On commercial installations involving long lengths of material, "tube" the material by folding one side of the sheet back on itself. Lay one-half of the tubed sheet into the spread adhesive and repeat the folding and pasting operation for the other side of the sheet. Roll the surface thoroughly with a weighted roll.

Seams

Double-cutting seams. On some installations involving long lengths of material, the seam can be double-cut. Lap the edges of the goods 3/4 inch and

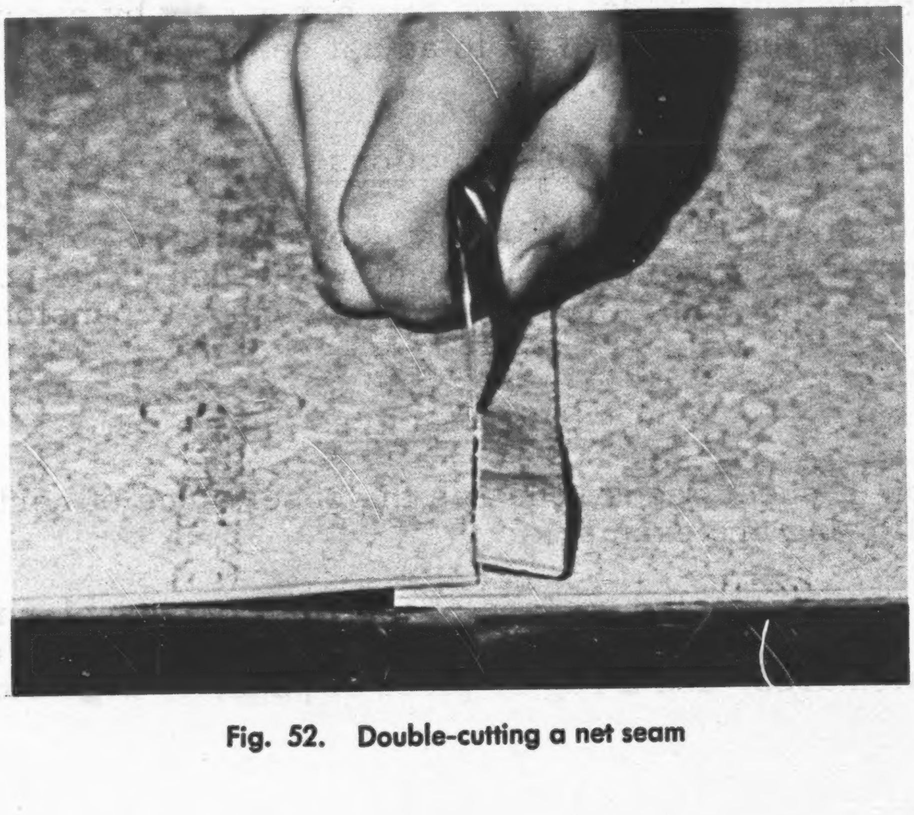

Fig. 52. Double-cutting a net seam

strike a chalk line 3/4 inch from the edge of the top sheet along the entire length of the material. Then make a cut on the chalk line completely through the top sheet and deep enough into the undersheet to leave a guide for the second cut. Cut the undersheet on this guide line and remove the selvage. A neat, workman-like double-cut seam results only from holding the knife blade at the correct angle. If the blade is held at a true 90° angle with the floor, a "net" seam will result. Tilting the knife blade away from the edge of the top sheet will result in an open seam. Tilting the knife towards the edge of the top sheet results in an unsatisfactory tight seam. Seams in heavy-gauge material should be thoroughly rolled.

Cross seams. The location of cross seams is very important in the average large installation of sheet goods. The odd measurements likely to be found in rolls of goods as they are delivered by the manufacturer create a need for cross seams. Be sure at all times to put cross seams in the least noticeable places--usually in the corners or at the ends of a room. It is always good procedure on jobs requiring two or more lengths side by side to stagger the position of the cross seams so that they occur in every other strip rather than in each adjoining strip. Briefly, a cross seam should never be put in an area where another cross seam is likely to be used.

Cross seams on plain linoleum, which is seldom used today, are usually made full-lapped, by either double-cutting or straightedging the under piece, using a seam scriber for transferring the underside edge to the top piece for cutting.

Remember never to cut the cross seams until all longitudinal seams have been finished and rolled. If the cross seams are cut before these longitudinal seams are finished, shrinkage will always occur at the cross seam.

Checking. While installation is proceeding, check all seams day to day as the job progresses. If the seams made the previous day were cut too tight or too loose, it will be possible to determine this error only by careful inspection. Experience teaches the correct way to adjust seam-cutting tools in order to prevent most of these troubles.

Obstructions

When it is necessary to fit around pipes, door jambs, or other projections, cut the linoleum on a straight line and remove enough of the goods to ensure a good fit, while at the same time allowing room for expansion and contraction around pipes.

Safe Practices

The installation of sheet goods requires the observance of certain safe practices. The following are examples:

- Having to cross a pasted surface at any time is poor planning, much like painting oneself into a corner. If dry stepping boards are not available for crossing a pasted area, use a rag or piece of paper to wipe stepping areas in the surface.

- Whenever possible, keep a clear route to tools.

- Remove the tools and equipment used for one part of the job before starting another. Return them to the tool box or the established tool and equipment storage place in the work area.

Checkup

Linoleum that is installed over wood floors must be laid over lining felt. 1. T F

Lining felt should always be laid in the same direction as the floor boards. 2. T F

The seams in lining felt should fall directly under the seams in the sheet goods. 3. T F

Wall scribing consists of transferring the exact contour of a vertical surface to the surface of the linoleum. 4. T F

Scribers should always be held square to the edge of the linoleum. 5. T F

A straightedge and pencil are used to draw the lines on the linoleum that mark the edges of the radiator pipes and legs. 6. T F

In the installation of linoleum, longitudinal seams are usually cut before the cross seam is cut. 7. T F

After each piece of linoleum has been fitted closely against one side wall, a chalk or pencil line should be drawn on the underfloor using the edge of the sheet as a guide. 8. T F

A blister in the felt indicates that the spot underneath is unpasted. 9. T F

Ironing a linoleum seam requires using a flat iron which has been disconnected. 10. T F

Since cross seams are seldom objectionable, they can be placed anywhere on an installation. 11. T F

In pattern scribing, dividers are held at right angles to the pattern. 12. T F

The scribing lines are transferred from the felt to the linoleum in pattern scribing. 13. T F

Pattern scribing can be used to advantage in small bathrooms and closets. 14. T F

TOPIC 4—PATTERNED FIELDS, BORDERS, AND FEATURE STRIPS

Assignment Installation Manual, Armstrong Cork Co., Chaps. 11, 12, and 13.

Introduction

- What special problems arise in laying patterned material?
- When is the border installed?
- How is a feature strip laid?
- What special requirements must be met in laying the field when border or feature strip is to be used?

Installing plain goods or nondirectional patterns is routine and involves only a few special problems. Techniques involving a somewhat higher degree of skill are required for making a neat patterned material installation; straight, attractive borders; and perfectly fitted feature strips.

Related Information *

Patterned Material

In laying patterned material, certain problems must be considered even when the cuts have been made as carefully as possible. The following are examples:*

- In fitting strips of patterned materials next to each other, bring the repeat in one strip directly opposite the repeat in the other.

- If mismatching is discovered after the material is cut, and the material has a burlap or felt back, allow it to become more pliable by keeping it in a warm room. Then take the piece that has stretched and roll it face-in on itself to shrink it. Take the short piece and roll it face-out to stretch it. Material stretched or shrunk in this way should be "tubed" (turned back across its length) rather than "lapped" (turned back across its width) before it is pasted.

- If, after two or more pieces of linoleum or sheet vinyl have been installed with perfect match, the pattern of the next piece runs long at one end, the material can be made to match by the following method:

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*Adapted from Installation Manual (Lancaster, Pa.: Armstrong Cork Co., 1962), pp. 60-62.

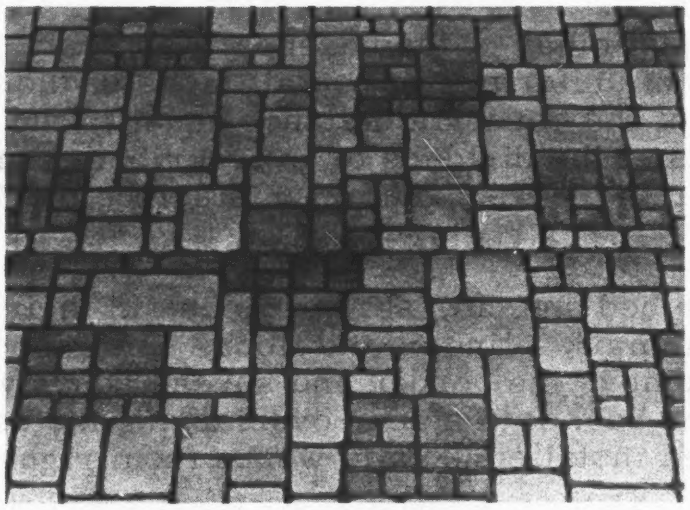


Fig. 53. Unmatched pieces of linoleum

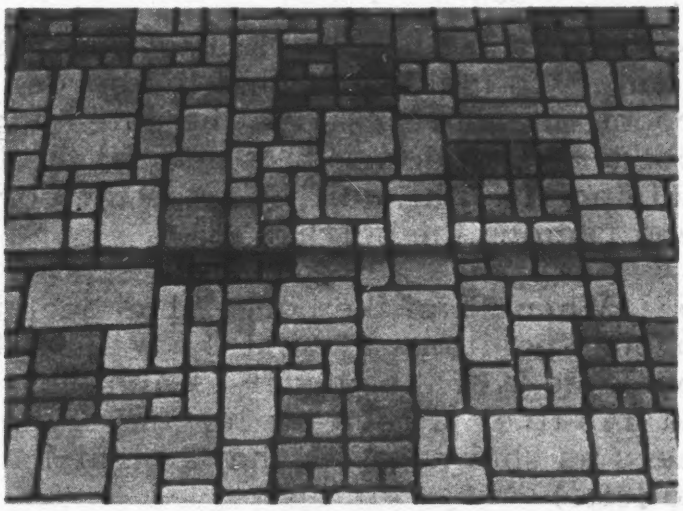


Fig. 54. Properly matched pieces (seams have been exaggerated to emphasize match)

1. Fit and paste down the end of the piece that matches the adjoining piece.
2. At the point where the pattern lines start running long, turn back the piece and spread paste on the felt.
3. Before replacing the material, place a thin strip of wood (such as lath or broomstick, depending on the size of buckle required) across the pasted area. The wood should be halfway between the beginning and the end of the off-match section.
4. Lay the material over the stick so that a buckle is formed.
5. If this buckle does not pull the pattern back into alignment with the adjacent piece, form one or more similar buckles along the out-of-line section until alignment is obtained.
6. Remove the stick and roll the material on each side of the buckle. Then roll it slowly from one side of the buckle to the other, gradually pressing the buckle into the paste to make the proper bond. This usually compresses the material enough to bring the pattern into perfect alignment with the pattern of the adjacent piece.

Simple Borders

Two methods are used for installing a simple border without a feature strip. The field may be laid first, or the border may be installed and the field pasted and underscribed to it. Either method results in a satisfactory installation. The single exception is a geometric or tile pattern, which requires that the field be laid first to avoid mutilating the design.

Laying the border first. When the border is laid first, the first step is to measure and cut the border. Then scribe the border to the wall, paste it down, cut the corners, and underscribe the field to the border.

- Cut the desired lengths from the roll of border material, allowing enough extra to overlap the adjoining piece at each corner. It is important to use a wide enough piece of border to allow for doorways and other setbacks.

- Place the pieces parallel with and just clear of the baseboard or door jamb. To make sure that the border is of uniform width on all sides of the room, measure in from the outer edge of the border a distance equal to the border width desired. Then set the legs of the dividers or overscriber from this point to the wall. Scribe the border to the wall, cut on this scribe mark, and remove the selvage edge.

- When all of the border has been scribed and cut, set the pieces in their proper positions against the wall. Then mark a line on the floor, using the outer edge of the border as a guide. Remove the border and spread adhesive to this line. Press the lengths of border back into place, overlapping the corners as shown. (Note that a right-handed installer usually works from right to left.)

- After all of the borders are pasted, corners should be cut while the adhesive is still fresh. Either butt or miter joints may be used for both inside and outside border corners.

To make a butt joint, use the overlapping piece as a guide for the knife and cut through the underpiece. Remove selvage and press both pieces into the adhesive. For a miter joint use a small steel straightedge, holding it diagonally from the corner of the wall to the point where the outer edges of the two border pieces intersect. Cut along the straightedge through the top piece. This leaves a mark on the underpiece. Then lift the overlapping piece and cut the underpiece on the line. Remove the trim and press both pieces into the paste. After either type of corner has been cut, it should be wiped clean with a damp cloth and rubbed smooth with a hammer.

- Whenever possible, when a border is to be laid, the linoleum should be laid across the floorboards to help ensure permanently tight seams. Cut the field material long enough to overlap the border slightly at both ends. Rough out any jogs or projections, but leave sufficient material to overlap enough at all points to permit underscribing. Underscribe and cut all seams in the overlapping field to the border, and cut on the scribe lines for a neat fit. Clean all seams and rub with a hammer, then roll the whole floor.

Laying the field first. When the field is laid first, the border is cut and pasted and the corners are cut in exactly the same way as when the border is laid first. It is also important to lay the linoleum strips across the floor boards if possible. The only difference in procedure is that the border is underscribed to the field.

Feature Strip

Making provision in the field. When a feature strip is to be included, it is especially important to plan the job so that the field material is laid across the floor boards.

Snap a chalk line around the entire perimeter of the room at a distance from the wall equal to the width of the border and feature strip combined. Use this line as a guide for the adhesive, which should be spread only inside the chalk line. Cut the field material slightly longer than required and cement it in place, overlapping the chalk line at the ends. Underscribe the seams in the field, cut the material, and roll it as in a simple wall-to-wall installation. Snap a chalk line again on the face of the material at the predetermined distance from the wall, and straightedge the field off to this line.

Many self-bordered installations are laid by cementing the field material from wall to wall and then cutting in the feature strip. This method offers an advantage where the room is small, where the feature strip is at a greater-than-average distance from the wall, or where a more elaborate treatment is used than a straight feature strip. However, butting the feature strip and border to the previously cemented field eliminates the problem of cleaning felt and adhesive from the floor before installing the feature strip. No seams appear in the border except at the corners. And, in those rooms with a dimension of slightly over 12 feet, an extra seam in the field is eliminated.

Cutting and scribing the border. When feature strip is used and the field has been laid and straightedged off, cut the border slightly narrower than the opening between the field and the wall. For example, if the exposed floor portion between the field and the wall is 7 inches wide, cut the border approximately 6-1/2 inches wide.

Next set the overscriber (or dividers) at the exact width of the feature strip that is to be inserted between the border and the field. Place the border in the opening (dry), holding its true edge tightly against the edge of the pasted field. Draw the overscriber, set to the width of the feature strip, along the walls, leaving a scribe mark on the border material.

Pasting border and feature strip. After the border has been cut on this scribed line, spread adhesive for it and the feature strip. Insert the feature strip or strips tightly against the cemented field. Then place the border in position with the true edge against the feature strip. Press the outer or scribed edge into place at the wall line. This assures neat seams. With the border and strips in place, the intersections at the room corners can be mitered or butted, as preferred.

Checkup

When a miter joint is cut in the border, the straightedge is held diagonally from the corner of the wall to the point where the edges of the two border pieces cross.	1.	T	F
There are two possible methods of installing a simple border without feature strip.	2.	T	F
If the border material is installed first, scribed to the wall and pasted, the linoleum field is underscribed to the border.	3.	T	F
Tightly rolling a sheet of goods face-in will tend to stretch it.	4.	T	F

Purposely creating a buckle across the width of a sheet is one way of bringing the pattern into alignment. **5. T F**

Material that is to be rolled face-in or face-out should first be warmed. **6. T F**

"Tubing" material means turning it back across its width. **7. T F**

Buckling should be done before adhesive is applied. **8. T F**

The wood used for buckling should be placed in the center of the off-match section. **9. T F**

If the field has a tile pattern, the border should be laid first. **10. T F**

The border should be wide enough to allow for the deepest irregularity in each wall. **11. T F**

In laying lengths of border, a left-handed installer usually works from left to right. **12. T F**

Corners in the border are cut after the border is scribed to the field. **13. T F**

When feature strip is used, the field should be laid last. **14. T F**

The field may be laid wall to wall and the feature strip cut in. **15. T F**

TOPIC 5—JOB RECORDS

Assignment Installation Manual, Armstrong Cork Co., Chap. 24.

Introduction

- What is the main purpose of a delivery ticket?
- What are job sheets and how are they used on the job?
- What specific items should an installer check on when inspecting an area to be laid?
- If floor sanding is to be done on the job, what equipment and extra materials should the installer order from the shop?

Careful records must be kept of any job from the time the job is contracted through a bid until the installer has made the last finishing touches on the installation. Job specifications, material lists, delivery tickets, job sheets, measurement and materials notes--each of these is important to doing the job in a businesslike way. The competent journeyman understands their importance and keeps his records accurate and complete.

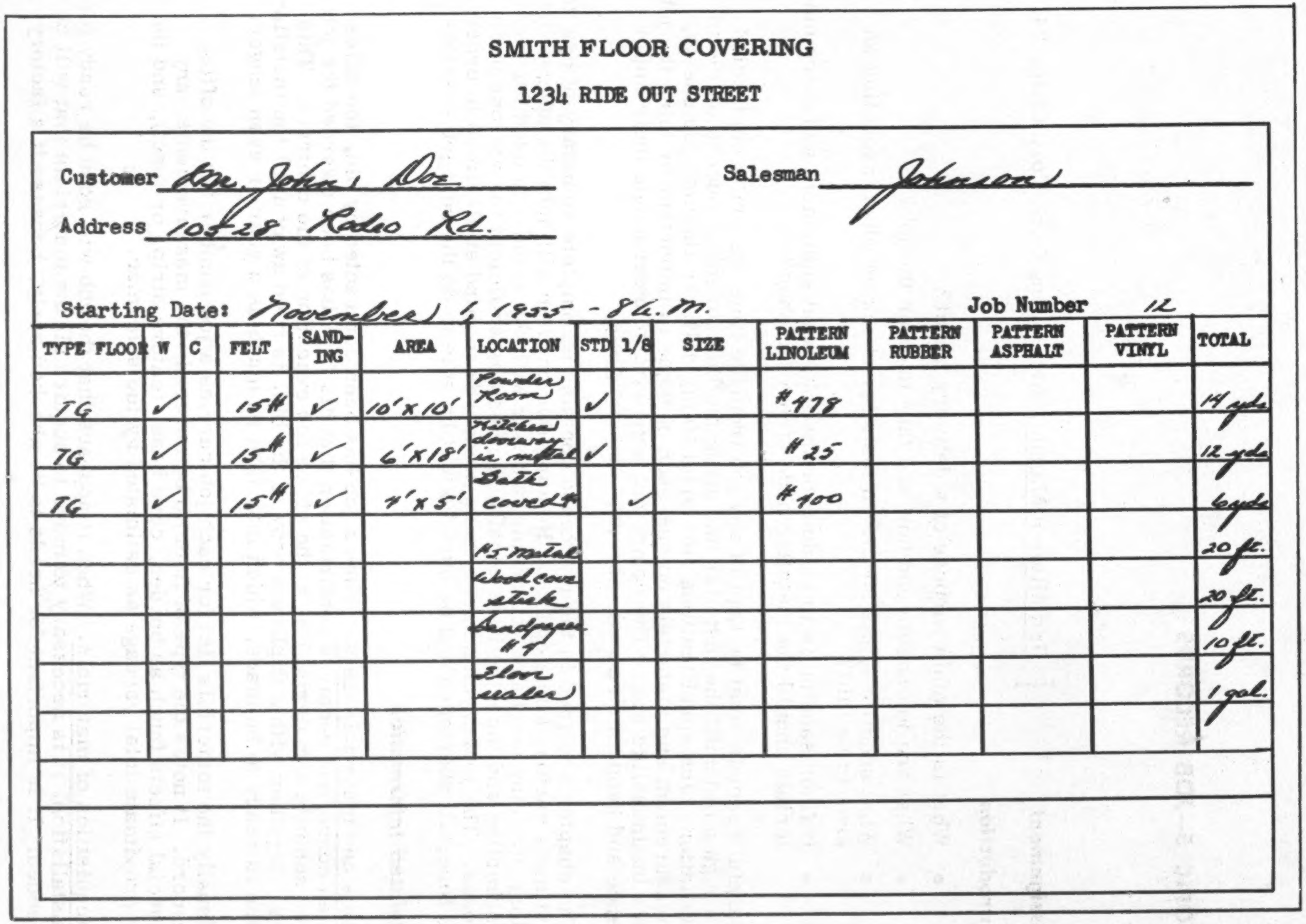
The chapter assigned in the reference contains a complete summary of how to estimate various kinds of jobs. Reading this chapter will help the apprentice floor covering mechanic to become familiar with the standards used for most estimating and the quantities usually accepted as sufficient for various purposes. The journeyman keeps these standards in mind at all times in order to forestall shortages and be sure he will be able to do the best job possible.

Related Information

Bids and materials lists. When a job has been contracted by bid, the salesman concerned receives confirmation that his firm has been awarded the job and submits a material list to the office for execution of the contract. This list, together with a duplicate copy of the bid, is filed away until the installation is ready to be made, which may take as much as a year or even longer.

Usually the materials list for each job carries a job number for the office record. It notes the type of floor to be covered, the measurements, any special effects (such as border, cove base, feature strip, or inset), and the approximate total yardage as estimated by the salesman.

Acquisition of materials. When it appears that the job will soon be ready for installation, it is necessary to move to acquire all the materials that will be needed. It is important for needs to be checked early, because if a factory



SMITH FLOOR COVERING

1234 RIDE OUT STREET

Customer Mr. John Doe

Address 10528 Rodeo Rd.

Salesman Johnson

Starting Date: November 1, 1955 - 8 a.m.

Job Number 12

TYPE FLOOR	W	C	FELT	SANDING	AREA	LOCATION	STD	1/8	SIZE	PATTERN LINOLEUM	PATTERN RUBBER	PATTERN ASPHALT	PATTERN VINYL	TOTAL
TG	✓		15#	✓	10'x10'	Powder Room	✓			#478				14 yds.
TG	✓		15#	✓	6'x18'	Kitchen doorway in metal	✓			#25				12 yds.
TG	✓		15#	✓	4'x5'	Bath coved #		✓		#100				6 yds.
						#5 metal								20 ft.
						Wood cove stick								20 ft.
						Sandpaper #4								10 ft.
						Floor sealer								1 gal.

Fig. 55. Sample job sheet

special order is involved, delivery may take time. The installer does not usually take part in this step, which is handled by the office.

Job sheets. To guide the installer, the salesman makes up a job sheet, describing the job in detail and all the materials and equipment needed. The shop foreman gives this job sheet to the installer, often giving him additional oral instructions as well. An installer should never do any work not specified on the job sheet unless it has been ordered by the shop foreman or received as orders in writing from a person in authority.

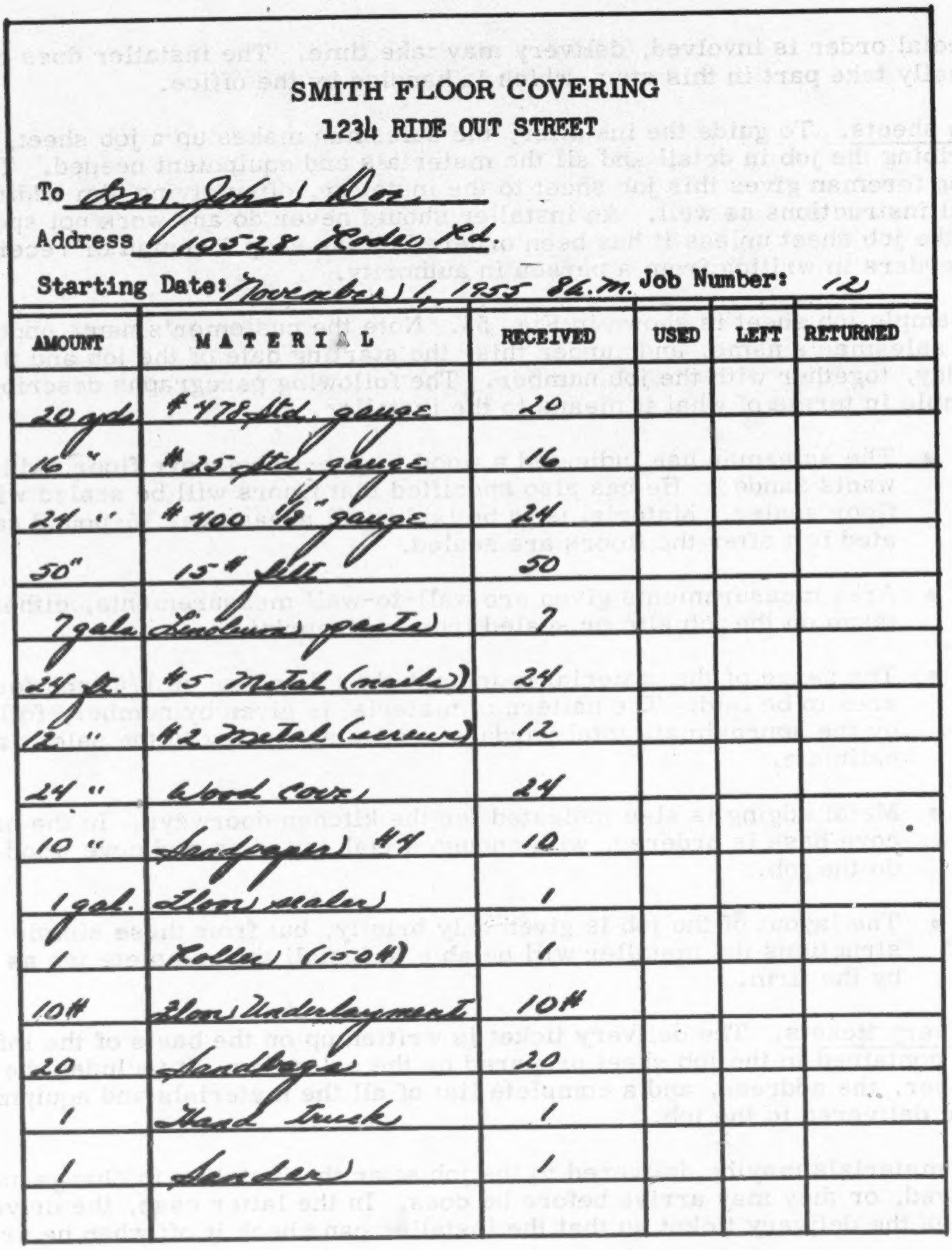
A sample job sheet is shown in Fig. 55. Note the customer's name opposite the salesman's name, and, under this, the starting date of the job and the time of day, together with the job number. The following paragraphs describe the sample in terms of what it means to the installer.

- The salesman has indicated a wood tongue-and-groove floor, which he wants sanded. He has also specified that floors will be sealed with floor sealer. Material is to be laid in all areas over 15-pound saturated felt after the floors are sealed.
- Area measurements given are wall-to-wall measurements, either taken on the job site or scaled from a blueprint.
- The gauge of the material is indicated as Standard or 1/8 inch for each area to be laid. The pattern of material is given by number, followed by the approximate total yardage needed according to the salesman's estimate.
- Metal edging is also indicated for the kitchen doorways. In the bath, cove base is ordered, with enough metal cap strip and cove wood to do the job.
- The layout of the job is given only briefly, but from these simple instructions the installer will be able to install the complete job as sold by the firm.

Delivery tickets. The delivery ticket is written up on the basis of the information contained in the job sheet prepared by the salesman. It includes the job number, the address, and a complete list of all the materials and equipment to be delivered to the job.

The materials may be delivered to the job after the installer in charge has arrived, or they may arrive before he does. In the latter case, the driver leaves the delivery ticket so that the installer can check it off when he arrives.

The delivery ticket is usually similar to the one shown in Fig. 56. A comparison of this ticket with the job sheet shows that the listing is approximately the same as that shown on the job sheet (Fig. 55), except that the piece of linoleum that happened to be in stock is larger than that specified. Thus, a check of each item listed on the delivery ticket will enable the installer to notice any difference between the amounts listed and the material delivered to the job.



SMITH FLOOR COVERING

1234 RIDE OUT STREET

To Mr. John Doe

Address 10528 Rodeo Rd.

Starting Date: November 1, 1955 8 A.M. Job Number: 12

AMOUNT	MATERIAL	RECEIVED	USED	LEFT	RETURNED
20 yds	#478 Std. gauge	20			
16 "	#25 Std. gauge	16			
24 "	#400 1/8" gauge	24			
50"	15# felt	50			
7 gals	Linoleum paste	7			
24 ft.	#5 Metal (nails)	24			
12 "	#2 Metal (screws)	12			
24 "	Wood cove	24			
10 "	Sandpaper #4	10			
1 gal.	Floor sealer	1			
1	Roller (150#)	1			
10#	Floor Underlayment	10#			
20	Sandbags	20			
1	Hand truck	1			
1	Sander	1			

Fig. 56. Sample delivery ticket

A careful check of each item in the RECEIVED column on the delivery ticket is essential, as it will become a permanent record. The heading on the delivery ticket is a duplicate of that on the job sheet, with name and job number indicated.

For this job, the following notes point up the value of the delivery ticket:

- Linoleum paste has been delivered, figured in amounts of 15 yards to the gallon, which in this case will also include paste for the felt yardage. Instead of using paste for only the linoleum, the installer will cement the felt with paste first, then cement the linoleum to the felt.
- The No. 5 metal was estimated at 20 feet. The delivery included 24 feet (2 pieces 12 feet long), since most types of metal edging are manufactured in 12-foot lengths. The extra footage could prevent the installer from having a metal joint between the mitred corners, thus avoiding a possible customer objection. The No. 2 metal, he can assume, is the doorway metal which was requested for the kitchen.
- The installer will need nails for the metal cap and cove wood and screws to use in the installation of the No. 2 doorway metal.
- Since sanding will be necessary and will require sandpaper of a No. 4 grit, cut to size, with a total of 10 linear feet, a sander is included, and this machine should be checked to see that the fuse plugs have also been sent. Two or three extra fuse plugs fastened to the sander will make possible the replacement of blown fuses without lost time. After sanding, the floors will be sealed with floor sealer, figured at 1 gallon for each 300 to 500 square feet.
- The roller delivered weights 150 pounds.
- As a precaution against lost time, the foreman has provided 10 pounds of underlayment in order to be safe.
- A handtruck is delivered on the job so that material can be shifted from place to place easily and without damage.

Other sources of information. In addition to the job sheet and delivery ticket, other sources of information may also be necessary for the installer in charge of a job. Any diagrams and blueprints needed are usually available at the same time as the job sheet. The good journeyman always checks the specifications if they are available on the job. When he arrives on the job, he notes any unusual conditions prevailing which might differ from the ordinary job and which do not show on the job sheet. Any changes necessary in the job should be verified immediately by the shop foreman, and often the salesman must be called in to correct or clarify deviations from the job sheet.

Listing during installation. Once any irregularities have been straightened out and all the materials needed have been checked, the installation can get under way. By checking his needs from day to day, an installer can keep ahead of the job to allow time to obtain any material or equipment he may need. With this precaution, no costly job delays will occur on this part of the installation.

When material cutting has been completed, the amount of material used should be entered in the USED column of the delivery ticket, and the size of the remaining pieces noted in the LEFT column.

At the completion of the job, the installer checks all remaining linoleum. Since each piece was marked as it was rolled out, it will be easy to determine the amount of yardage used on the job and the amount returned to the firm. If the installer has kept a notebook record as he proceeds, this will be easier yet to determine. Such records of the linoleum, felt, and adhesive used and remaining will save time for everyone.

Checkup

The original materials list is made up by the ____1____ after acceptance of the ____2____ is confirmed.

1. ____________
2. ____________

Checking all the materials needed for a job must be done early in case ____3____ ____4____ is necessary.

3. ____________
4. ____________

When the job is ready for installation, the installer in charge receives a(n) ____5____ ____6____ made out by the ____7____.

5. ____________
6. ____________
7. ____________

When the driver leaves the materials on the job, he leaves a(n) ____8____ ____9____, which has been made up on the basis of the ____10____ ____11____.

8. ____________
9. ____________
10. ____________
11. ____________

During installation, the installer in charge should check the materials ____12____ ____13____ in order to avoid unexpected delays because of shortages.

12. ____________
13. ____________

When differences exist between entries on the job sheet and those on the delivery ticket, the ones on the delivery ticket must always be ____14____.

14. ____________

The job sheet and delivery ticket list ____15____ as well as materials.

15. ____________

Group Discussion

1. Describe a job sheet.
2. Describe a delivery ticket.
3. What is the difference between a job sheet and a delivery ticket?
4. Give some advantages in keeping accurate records.
5. Why are all measurements and material notes filed as a permanent record?

unit G

COVING SHEET GOODS

The coving of sheet goods is a common practice in the floor covering trade, especially in residential work. Coving, whether top-set base, self-cove, or border cove, enhances any installation, but the value of coving is not entirely esthetic. From a strictly practical viewpoint, coving flooring results in the elimination of sharp corners and crevices, thus making proper cleaning an easier task.

As in all phases of this trade, new products and techniques have helped to increase the popularity of cove work, and the floor covering installer can demonstrate his skill and versatility in this task better, perhaps, than in any other. Outside corner fills, border cove, or radius cove--each job presents a different challenge and demands a different knowledge.

This unit examines the problems relating to each of these jobs and the procedures recommended for performing the work.

TOPIC 1— TOP-SET BASE

Introduction

- **In what forms is top-set base available?**
- **What are the prescribed methods of making inside and outside corners without using preformed corners?**
- **What is the best method of applying adhesive for installing rubber or vinyl base?**

Top-set base, which is a preformed cove base applied to the wall, serves as a finish for the juncture of the wall and the floor. It matches or complements the floor covering material but is not of the same pattern. If top-set base is to be used, the field is laid first and fitted to the wall. Then the top-set base is laid against the wall, its foot resting on top of the floor covering material.

Available on today's market are two general kinds of top-set base: a pure rubber base and a vinyl base. They are very similar in size and shape. However, the vinyl base usually has a higher gloss or sheen and is more rigid than the rubber. The pure rubber base is easier to work with and, because it is more flexible than the vinyl compound, may be made to conform to irregular walls with relative ease.

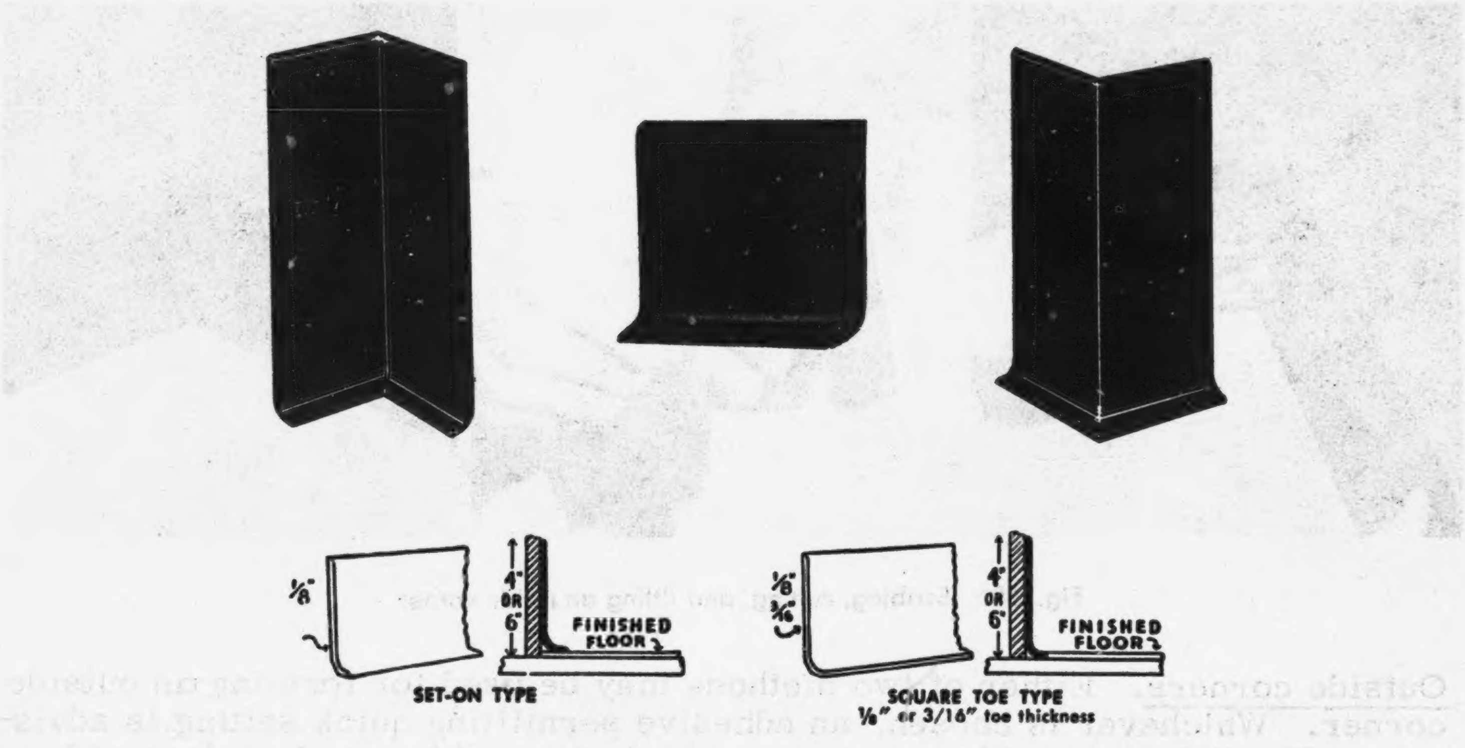


Fig. 57. Types of top-set base

Both types of base should be applied to walls with the adhesives recommended by the manufacturer and according to the manufacturers' specifications. Most manufacturers provide some type of corrugation on the back of the base. This provides a key to hold the adhesive and assures good bonding.

Most manufacturers of top-set base also market preformed outside and inside corners for the three common sizes of base, which are 2-1/2", 4", and 6" (Fig. 57). If preformed corners are not available, the corners required can be formed from straight pieces of top-set base.

With preformed corners, the most critical part of the installation is getting the ends of the corner pieces to fit snugly against the straight wall pieces.

Related Information

Forming Corners

Because preformed corners in the size and color desired are not always available, an installer must know how to form corners.

Inside corners. To form the first side of an inside corner, extend a straight strip of base into the corner to the end of the wall. Then fit a second strip into the corner at right angles to the first and, with a pair of dividers, scribe onto its end the profile of the first piece (Fig. 58). Use a sharp linoleum knife to cut the second piece along this profile, beveling as the cut is made. Then paste the second piece against the first and against the wall to complete the inside corner.

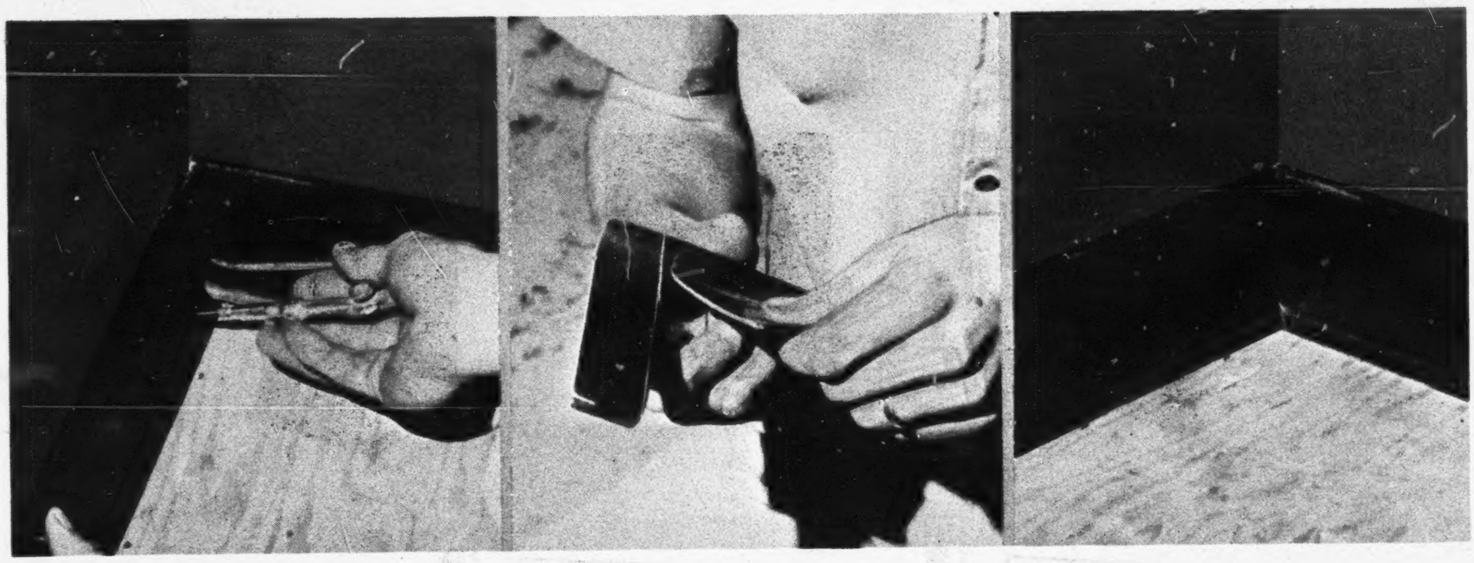


Fig. 58. Scribing, cutting, and fitting an inside corner

Outside corners. Either of two methods may be used for forming an outside corner. Whichever is chosen, an adhesive permitting quick setting is advisable. The first method is not always satisfactory with certain colors of base because the pressure created at the bend may cause discoloration at that point; therefore, the second method is sometimes preferred.

1. The first method (Fig. 59) calls for using a straight strip that extends well past the corner. On the back of the strip, draw a vertical line at the turn of the corner. Bend the strip face to face on this line and, with a very sharp knife, cut away about half the body from the back of the strip. To do this make a single cut, starting at the top and cutting toward the bottom, and keep all the cutting on the turn side of the line. Removing this material from the back of the strip allows it to lie flat against the wall.

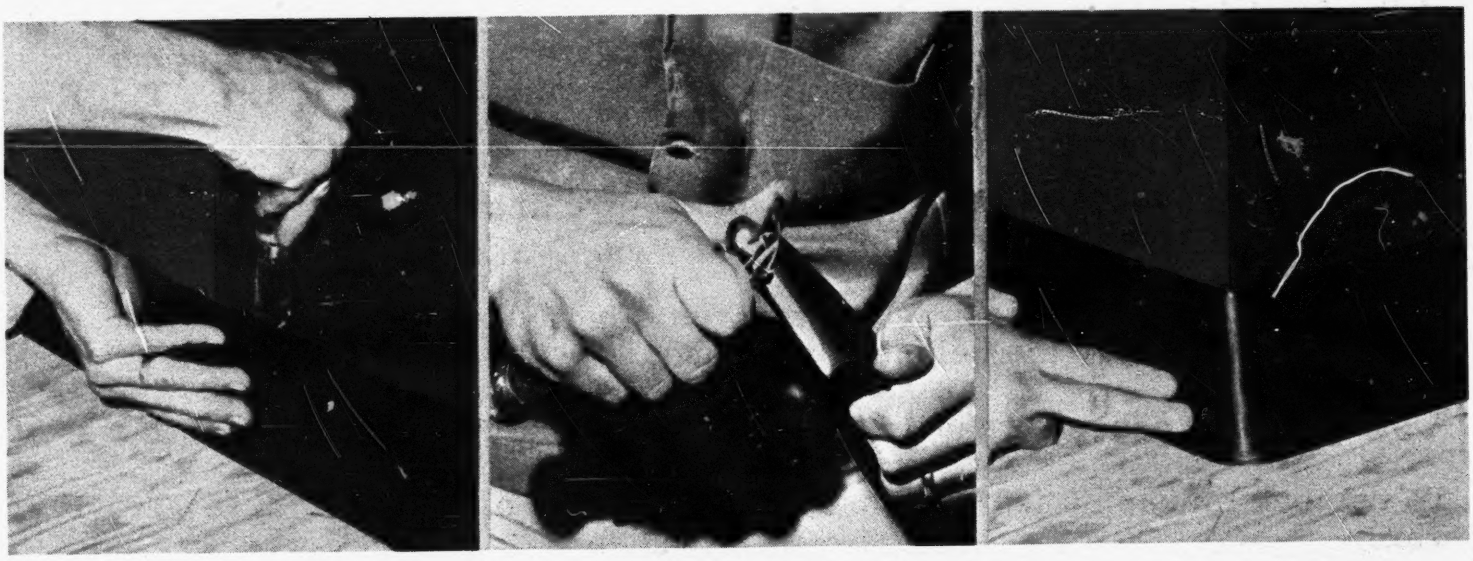


Fig. 59. Scribing, cutting, and fitting an outside corner

When wrapping the strip around the corner, hold it tight against the wall with a downward pressure so that the foot will retain its shape.

2. In the second method, use an outside corner scribe. Apply the first piece of base to the corner and extend it 3/4 inch past the corner line. Then set a scrap piece of base against the other side of the corner and butt its end against the back of the first piece. With an outside corner scribe, trace the profile of this scrap onto the extended end of the first piece. Use a sharp knife to cut along this profile on the first piece, beveling at a 60° angle. Then remove the scrap piece and replace it with a finish piece of base. Use the outside corner scribe to trace the profile of the first piece onto this, and cut and bevel this profile at a 60° angle also. The two pieces are then ready to be fitted and pasted.

Applying Adhesive

With both straight pieces and corners, adhesive can be applied either to the back of the base or to the wall. If adhesive is applied to the wall, strike a chalk line 1/4 inch lower than the height of the base used, and spread the adhesive to this line.

After excess cement has been wiped from the wall or the face of the base, roll the base firmly into place with a small steel roller like that recommended for installing asphalt tile. Marks of dirt that have gotten on the base during installation should be removed by applying a good polishing wax.

Checkup

Top-set base is applied after the floor covering material has been installed. 1. T F

Vinyl top-set base is more pliable than rubber. 2. T F

In installing preformed corners, allowance must be made at the joint for expansion of the base. 3. T F

Two acceptable methods are used for forming outside corners. 4. T F

The adhesive used with top-set base should preferably be applied to the wall. 5. T F

The adhesive should be applied to an area slightly less than that covered by the height of the base. 6. T F

A slow-drying adhesive should be used for outside corners. 7. T F

To remove marks on top-set base, rub it with a polishing wax. 8. T F

The foot part of top-set base should be under the floor covering material. 9. T F

The method of applying top-set base by cutting a straight strip that extends well past the corner is sometimes inefficient because it may cause discoloration of the material. 10. T F

TOPIC 2— TRIMMING OUT

Introduction

- **What tools are used to cut and form cap metal?**
- **How is cap metal measured for a cut on inside and outside corners?**
- **How should cap metal be secured to the wall?**
- **What are the two methods of installing metal trim on self-coving or border coving?**

Although the top-set base described in the previous topic is used in some installations, both self-coving and border coving are becoming increasingly popular. The skills required for finishing an installation with either of these types of coving are the most complex the installer is required to use in his trade.

A metal cap strip is used with both self-coving and border coving. It is usually installed after the floors and walls have been prepared to receive the floor covering materials. This metal strip forms a decorative finish for the top edge of the material and provides a stopping point on the wall.

Related Information

Cap Metal

Materials and tools. The main tools required for the installation of cap metal are a hacksaw, miter box, metal miter tool, hammer, rule or tape measure, tin snips, chalk line, level, and nail set. The nail set should be used to set the nails, for the surface of the metal should be kept free of dents such as might be caused by the hammer head coming into contact with the metal.

The metal miter tool consists of a handle that is constructed like a pair of double hinged pliers and has sufficient leverage to cut metal easily. A number of different, interchangeable dies to cut out various shapes of notches in metal are used in the metal miter.

Most metal used in the floor covering trade is either a chrome aluminum alloy or stainless steel. A hacksaw blade with 18 to 24 teeth per inch should be used for cutting the chrome metal. A hardened blade with 32 teeth per inch should be used for cutting stainless steel.

Many styles of cap metal with various external shapes are available, but so far as work in cove base installation is concerned, they are all used in essentially the same way.

Shaping the strip. Extreme accuracy of measurement is necessary in fitting the metal around the wall, because open corners are unsightly and pieces too long cannot be shrunk. Taking off "just a little more" is very difficult. Therefore, make certain that the first cut is the right cut.

Two methods of forming corners are used, both of which are acceptable. However, the first method, though often used, is not preferred with outside corners because it creates dangerously sharp edges. The two methods are as follows:

1. Cutting method. Whether the first corner is to be an inside or outside corner, take the first measurement from a door casing to the point where the wall ends in the corner. Transfer this measurement to the cap metal and, using a hacksaw and miter box, cut the metal at the correct angle exactly on this mark. When cutting the metal, hold it securely in the miter box and apply pressure on the forward stroke of the hacksaw. The metal may be clamped in the miter box to hold it securely while it is being cut.

To cut the other side of the corner, measure from the start of the other wall at this first corner to its end in the next corner (which may be either an inside or outside corner). Transfer this measurement to a second piece of metal, then cut it with a hacksaw in a miter box. Again, the metal must be cut at the correct angle and exactly on the mark.

For the second corner, follow the same procedure at the other end of the second piece of cap metal, and complete that corner by cutting a third piece of metal. Form the remaining corners in the same way.

2. Notching and bending method. In the second method, V-shaped wedges are removed from the cap metal so it can be bent. The allowances that must be made in measuring for the thickness of the metal are important. Table 1 gives a handy reference, and Fig. 60 illustrates the parts of the cap metal.

TABLE I

Allowances for Corners in Notching and Bending Method

The distance from inside corner to inside corner	=	Total length minus two times flange thickness
The distance from inside corner to outside corner	=	Total length plus width of top minus flange thickness
The distance from dead end to inside corner	=	Total length minus flange thickness
The distance from outside corner to outside corner	=	Total length plus twice the width of top
The distance from dead end to outside corner	=	Total length plus width of top

- **If the first corner to be bent is an inside corner, such as that shown in Fig. 61, A represents the starting point at the door casing, B the first corner to be bent, and C an outside corner that is the second corner to be bent.**

- **When measuring from A to B, subtract 1/16" (or the thickness of the flange) from the total measurement, because this thickness of the flange is, in effect, being added to the length. Thus, 1/16" is taken off the measurement for each half of an inside corner.**

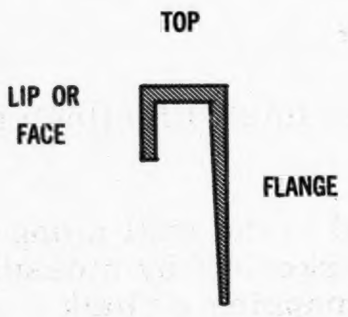


Fig. 60. Parts of cap metal

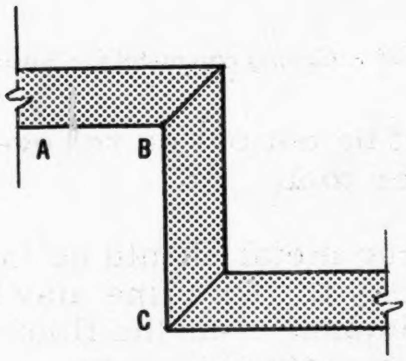


Fig. 61. Forming an inside corner to an outside corner

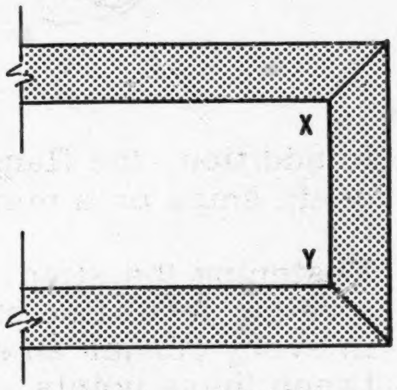


Fig. 62. Forming an inside corner to an inside corner

- **If the corner to be formed is like corner X in Fig. 62 (that is, the wall extends from an inside corner to an inside corner), subtract twice the thickness of the flange (or 1/16" + 1/16" = 1/8") from the measurement X to Y.**

- **In measuring the distance B to C in Fig. 61, remember to add the width of the top of the metal (which is usually 3/16") to each half of the outside corner C. Thus, for measurement B to C, add 1/8" (3/16" - 1/16" for the inside corner = 2/16" or 1/8").**

Once the required measurements have been determined, the metal may be notched in one of two ways: (1) filed out with a square metal file, or (2) cut with a metal miter tool.

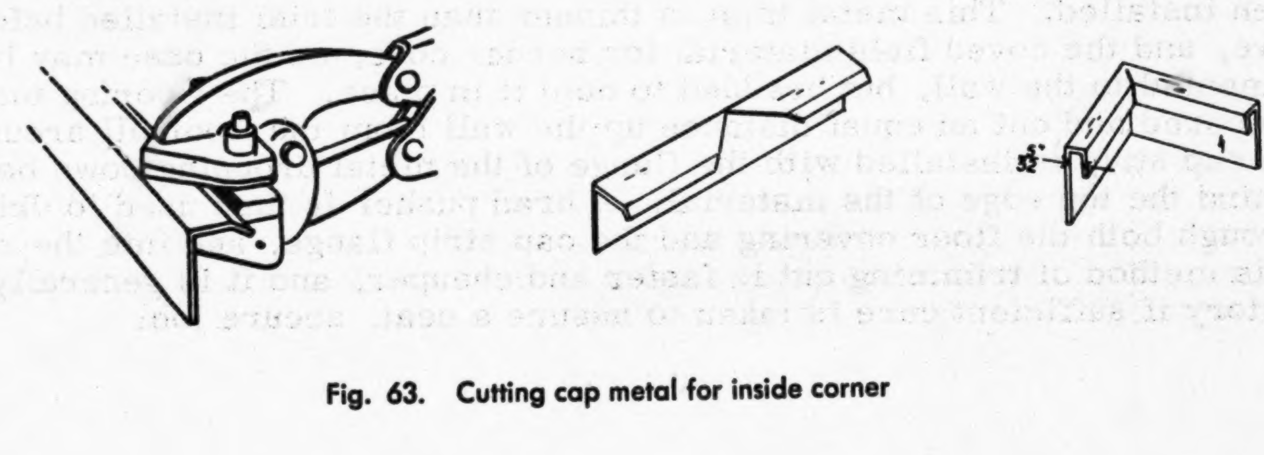


Fig. 63. Cutting cap metal for inside corner

For an inside corner, cut from the front of the metal, but leave the top portion of the flange intact (Fig. 63). For an outside corner, notch from the back of the metal, but leave the face (or lip) of the metal intact (Fig. 64).

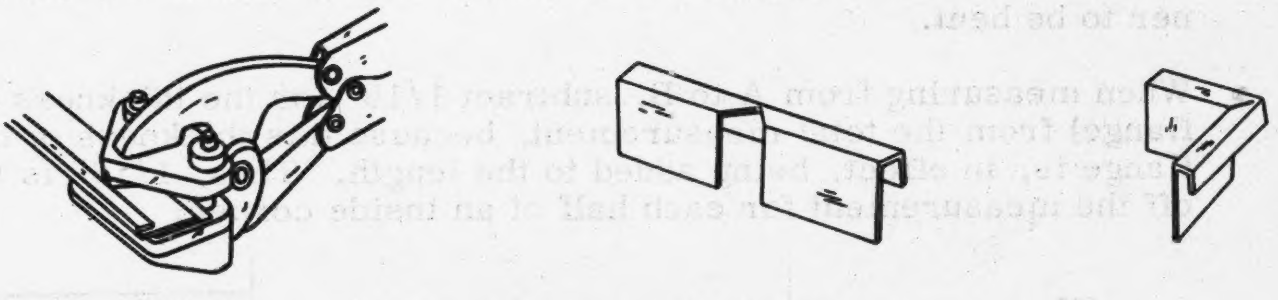


Fig. 64. Cutting cap metal for outside corner

In addition, the flange must be cut out or relieved. Do this with either a pair of tin snips or a metal miter tool.

Fastening the strip. The cap metal should be fastened to the wall along a straight level line of any height. This line may be marked off by measuring in every corner an equal distance from the floor and snapping a chalk line between these points. Another method is to use a small stick of wood of the required height and let the lip of the metal rest on this stick approximately every 18 inches as nailing proceeds around the room.

In a wooden wall or nailing surface, the metal should be fastened every 6 to 8 inches. On plaster walls quite often the only points with any holding ability are the studs. On such walls, the nails must be long enough to go through the plaster and anchor securely into the stud. Studs are on 16 inch centers in most walls.

Galvanized or cement-coated nails are recommended instead of regular steel wire nails because of their better holding power. If the cap metal is to be nailed to a cement block wall, small case-hardened screw nails can be driven into the mortar joints. For installations on concrete or ceramic tile walls, one method is to drill small holes and plug them with wood for nailing points; another method is to fasten the metal with contact cement.

Thin cap metal strip. In some areas, cap strip is applied after the coving has been installed. This metal trim is thinner than the trim installed before the cove, and the coved field material (or border cove, as the case may be) is not cemented to the wall, but bradded to hold it in place. The flooring material is scored and cut an equal distance up the wall from the floor all around, and the cap strip is installed with the flange of the metal dropping down below and behind the top edge of the material. A brad pusher is then used to drive brads through both the floor covering and the cap strip flange, and into the studs. This method of trimming out is faster and cheaper, and it is generally satisfactory if sufficient care is taken to assure a neat, secure job.

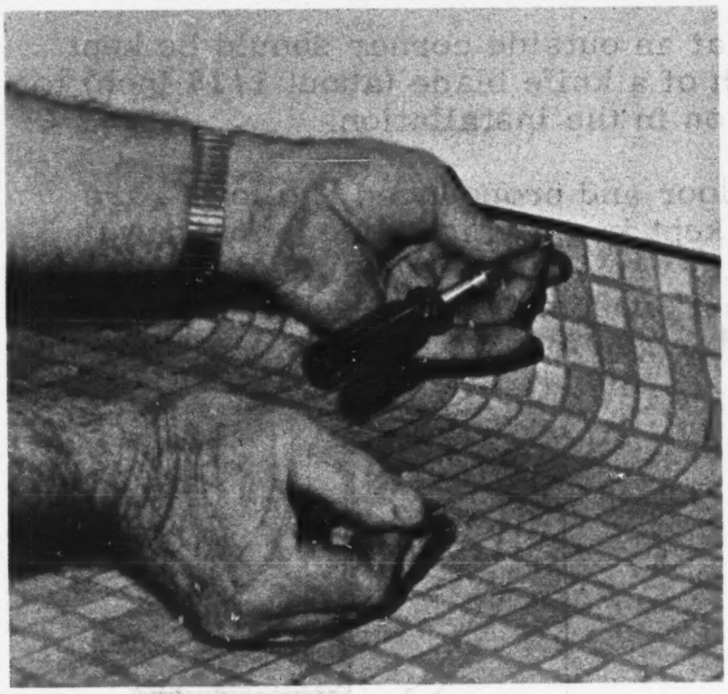


Fig. 65. Securing cap metal with brad pusher

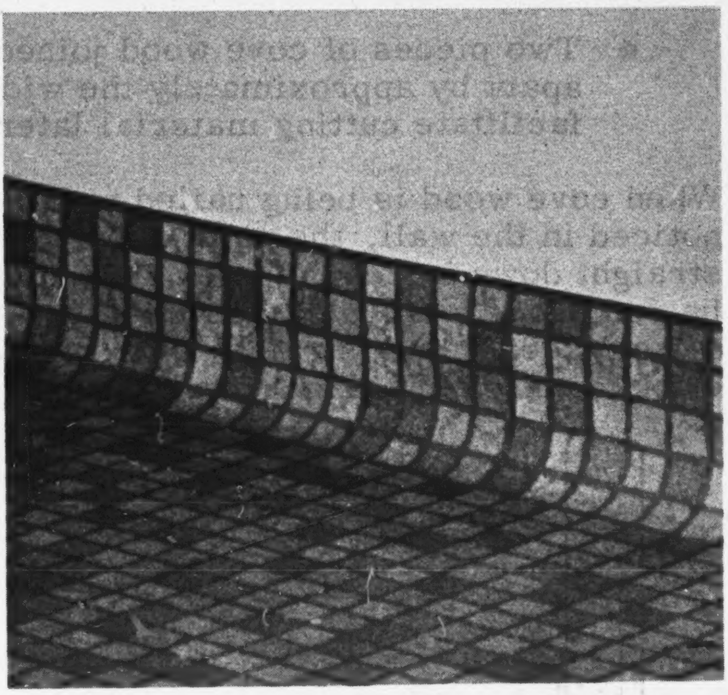


Fig. 66. Completed installation of cap metal

Cove Wood

Cove wood is also known as fillet strip, cove stick, or backing strip. It is used with coving as the backing at the junction of floor and wall (Fig. 67). It may be made of various materials, such as wood, saturated felt, or wax-filled cloth, but the most widely used and least expensive is wood. It is made in sizes from 1 inch to 1-1/2 inches.

Cove wood provides the contour of the curve both along the wall and at the corners. Because of the importance of this contour, a few precautions must be kept in mind:

- The cove wood must be fitted at the corners as neatly as possible, with special attention being given to outside corners.
- The cove wood must be nailed so that it is fixed firmly in place, usually on not less than 12-inch centers.
- If nails are used (rather than staples), care must be exercised to prevent the hammer head from damaging the wood.
- Nail heads must be driven flush with or slightly below the surface of the wood so they will not show through the surface of the material.
- If more than one piece of cove wood is used along a wall, not more than 1/2 inch of space should be left between pieces.

- Two pieces of cove wood joined at an outside corner should be kept apart by approximately the width of a knife blade (about 1/16 inch) to facilitate cutting material later on in the installation.

When cove wood is being nailed to the floor and pronounced "hollows" are noticed in the wall, the stick should be kept in a straight line by nailing it straight down instead of back at an angle. Any bumps along the wall should be removed, although sometimes shaving off some of the stick is advisable to help keep it in a straight line. A staple gun may be used for fastening the stick to the floor; also a brad pusher.

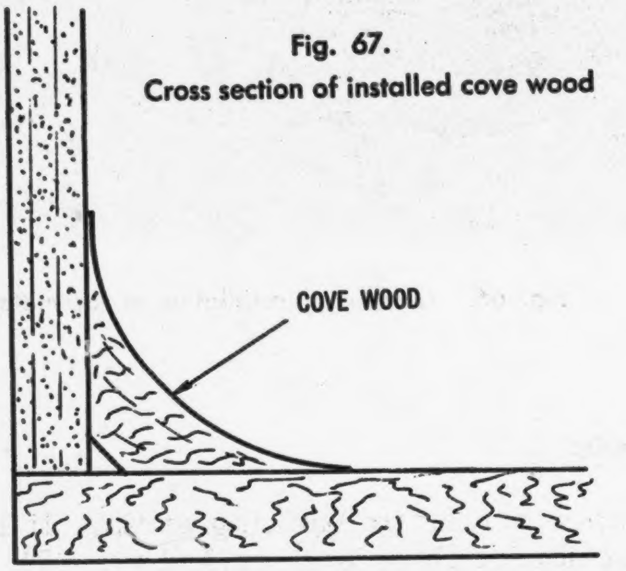


Fig. 67. Cross section of installed cove wood

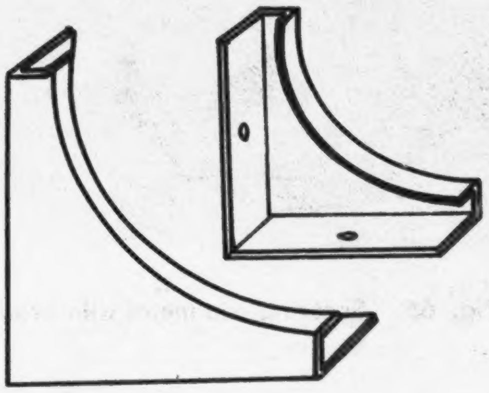


Fig. 68. Metal end stops for cove wood

Metal Corners and Stops

Although the practice is not general on the west coast, cove base jobs are installed with metal inside and outside corners and metal end stops. The corners and stops are usually made of polished stainless steel or chrome alloy to prevent rusting as well as to give a pleasing appearance. They are preformed and available in two widths, 4-1/2 and 6 inches.

Metal corners. When metal corners are used, the cap strip must be placed so as to coincide with the tops of the corners. This occasionally presents a problem because the installer cannot always adjust the cap metal height to exactly 4-1/2 or 6 inches. Both sizes of corners can be shortened somewhat by using a "parrot-nosed" snips or hacksaw and cutting off the top end. Care should be taken to smooth and file the top if it has been cut off.

The metal corners have flanges on both sides with slots at the top and bottom for fastening them to the wall and floor. The cove wood should be cut square and stopped approximately 1/2 inch from each corner to permit the insertion of the metal corner. When the corners are installed properly, they form a 90° angle with the cap strip. This angle permits the use of a square to determine the cut at the end of the piece of cove material. However, if a test piece indicates that this method will not work, the material can be scribed at the corners.

Metal end stops. Metal end stops are designed to cover what normally would be an open-end piece of cove. They fit on the end of the cove stick and are nailed to the wall and floor in the same way as the metal corners. If the construction of the room is such that a wood casing is provided around the door frame, the end stops are of little use. In the case of "bull-nosed" plaster construction, they are ideal. On this type of job, the cap metal is returned down the wall to the point where it meets the top of the end stop. This makes a continuous metal edging all the way to the floor (Fig. 68).

Checkup

Metal cap strip is designed for use primarily with border coving. 1. T F

One of the functions of cap metal is to provide a decorative finish at the top of the cove. 2. T F

A hacksaw blade with 18 to 24 teeth per inch should be used for cutting stainless steel cap metal. 3. T F

For notching and bending cap metal from an inside corner to an inside corner, add two times the width of the top of the metal to the measurement. 4. T F

To notch and bend cap metal from an inside corner to an outside corner, add the width of the top of the metal minus the thickness of the flange to the measurement. 5. T F

When filing a notch for an outside corner, leave the face (or lip) of the metal intact. 6. T F

Studs are generally installed on 18" centers for most walls. 7. T F

Cement-coated nails are recommended for nailing cap metal on ordinary walls. 8. T F

Galvanized nails driven into the mortar joints are recommended for fastening cap metal to cement block walls. 9. T F

Saturated felt is the most commonly used material for cove backing. 10. T F

Cove wood should be nailed at least every 12". 11. T F

Where the cove wood meets at an outside corner, an opening approximately the width of a linoleum knife blade should be left. 12. T F

Preformed metal corners are available in widths of both 4-1/2" and 6". 13. T F

"Bull-nosed" plaster construction requires metal corners. **14. T F**

End stops are unnecessary where wood casing is provided around the door frame. **15. T F**

TOPIC 3—PATTERN SCRIBING FOR ONE-PIECE COVE

Assignment	Skilled Hands and Skilled Installers, 16 mm. sound film (color), Congoleum-Nairn Inc.

Introduction

- In what ways is pattern scribing used in coving work?
- What material is generally used for patterns?
- Why does the overscriber play such an important role in pattern work?

Pattern scribing is the term applied to using a pattern or template to ensure the correct fit of a piece of material. Pattern scribing requires using another material, usually saturated felt, which is made to fit with the aid of an overscriber. The resultant pattern is then transferred to the material that is to be installed.

Pattern scribing is used with self-coved material and with border cove, but it is used less extensively with border cove. It is particularly useful with certain kinds of corners and with radius cove. This topic describes its use with one-piece cove.

Related Information

Placing the felt. Figure 69 illustrates the use of saturated felt as a pattern. Shown is one inside corner of a room with the felt tacked in place. The room is to be self-coved. Corners have been cut out of the felt so that point A is at the bottom of the miter in the cove stick. The top of the felt is stopped just below the flange of the cap metal, and the felt is held in place with thumb tacks as indicated. The felt must be tight against the cove stick around the room.

If more than one piece of felt is needed to pattern the entire room (as is usually the case), make certain that the position of one sheet with respect to another is well marked. (Note match marks in Fig. 70.) Do this by butting the two edges of the felt together and then making two or three marks with a pencil or knife across the seam. If the felt is lapped instead of butted, make a mark also along the edge of the top sheet. In fitting around objects to be scribed, keep the felt approximately 1/2 inch away from the objects.

Scribing the felt. When the felt is fastened in place securely and marked for position, the installer is ready to start scribing. Set the overscriber so that it extends far enough that the felt can be marked even at the widest point in the room if the room is out of square.

Fig. 69.
Using saturated felt as a pattern

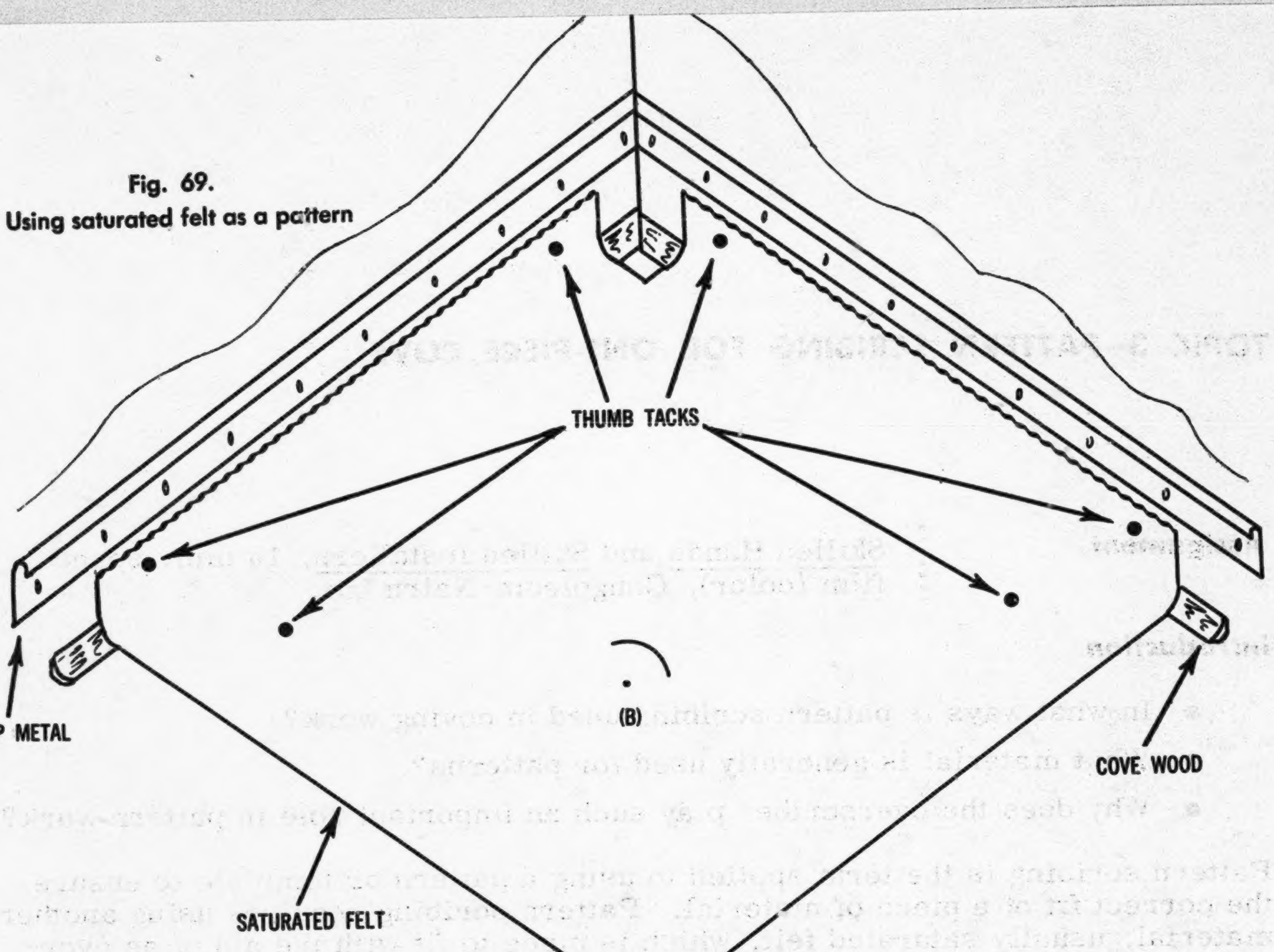
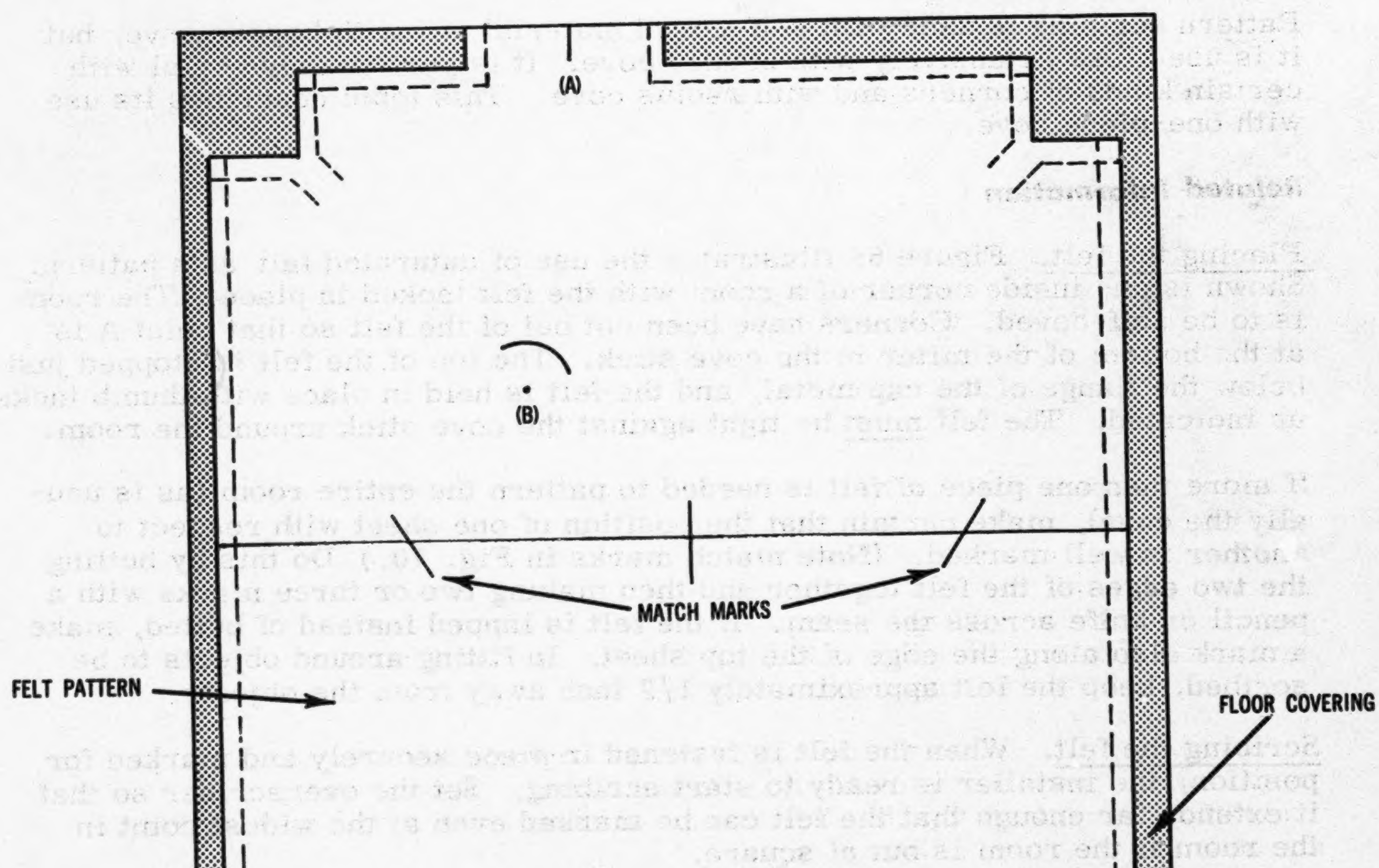

THUMB TACKS
(B)
CAP METAL
COVE WOOD
SATURATED FELT

Fig. 70.
Using two pieces of felt pattern


(A)
(B)
MATCH MARKS
FELT PATTERN
FLOOR COVERING
(A)

The next step is to carry the overscriber setting onto the felt (point B) in case the setting should be changed accidentally during the operation. Now hold the overscriber parallel to the floor and at right angles to the wall. Start at the top of the corner and bring the scriber down the corner, allowing the needle point to mark a line on the felt. Repeat this operation on the opposite side of the corner and on the balance of the inside corners.

After all of the corners are scribed, mark the top of the felt below the cap metal with the overscriber, at the same setting used for the corners. For this operation, hold the overscriber vertical to the floor. Do this around the entire room. Scribe any vertical surfaces to which the floor covering must be fitted, such as door casings and tubs. The overscriber setting must remain the same at all times.

Before removing the felt pattern, it is wise to put positioning marks on the felt and wall or floor (points A, Fig. 70) as aids in getting the floor covering properly placed for installation. Do this by making one mark in the doorway and another on an opposite wall, or by marking opposite walls.

Transferring to the material. After all scribing and marking are finished, remove the felt and reassemble it on top of the material. Hold it in position with weights, tape, or very small staples. The use of thumb tacks should be avoided for they leave holes in the material. Figure 70 shows the felt assembled on the material. The dotted lines indicate scribe marks. After the felt is securely in place on the material, check the overscriber once again to make certain the setting has not changed. Now place the overscriber so that the smooth leg rides in the groove on the felt and the needle makes a mark on the material. Mark corners and vertical surfaces first.

After corner and vertical surface scribing has been transferred, the installer is ready to mark the edges that will fit to the metal. This calls for a change in the overscriber setting. The setting must be increased because otherwise the material will not extend up into the metal but instead will come only to the bottom, where the scriber leg was when the pattern was marked. This increase in setting is usually 1/8 inch but will have to be determined by the type or size of metal used.

After all the scribe marks are completed, cut along the marks with a knife. Leave the felt in position until all the marks have been cut, to make certain that no part has been missed.

Checkup

The overscriber should be kept at the ___1___ setting except for scribing along metal. 1. __________

Patterns may be made of ___2___ felt. 2. __________

The felt pattern must be kept tight against the ___3___ ___4___. 3. __________
4. __________

The tool required for marking patterns is a(n) ___5___. 5. __________

If more than one piece of felt is used, the seams may be __6__ or __7__ .

6. ________
7. ________

Scribing is required for fitting floor covering around irregular vertical surfaces, such as door __8__ and __9__ .

8. ________
9. ________

A pattern is also known as a(n) __10__ .

10. ________

Reasonable __11__ is required even when using a pattern.

11. ________

In fitting a felt pattern around objects, the felt should be kept away from objects by about __12__ .

12. ________

The position of one sheet of felt with respect to another should be __13__ __14__ .

13. ________
14. ________

The overscriber is held __15__ to the floor and at __16__ __17__ to the wall.

15. ________
16. ________
17. ________

Before he removes the felt pattern, the installer should put two or three __18__ marks on the felt and wall or floor.

18. ________

The installer should leave the felt in position till all the marks have been __19__ .

19. ________

When edges are marked to fit to the metal, the overscriber setting should be increased by about __20__ , depending on the metal used.

20. ________

TOPIC 4— OUTSIDE CORNER FILLS

Introduction

- What are the two types of outside corner fills and how do they differ?
- What is the proper procedure for making a mitered corner?
- Why is the V-plug outside corner fill preferred in many cases?
- Can the V-plug type of fill be used when installing patterned material?

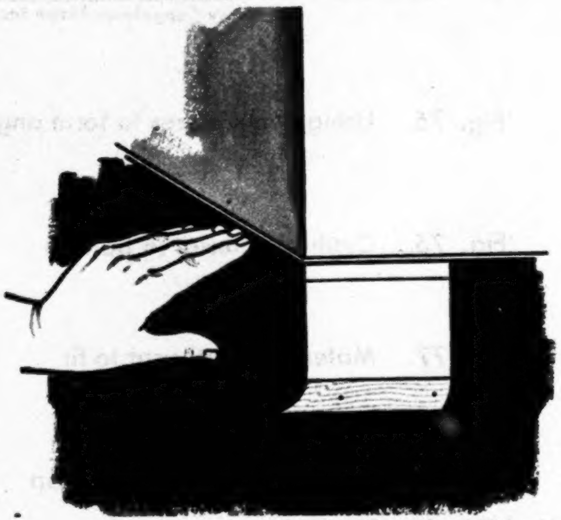
One of the most intricate operations to be performed in a one-piece cove installation is the forming of an outside corner. Two types of outside corner fills should be understood: the "mitered" fill and the "wrap-around" or "V-plug" fill.

Related Information

Mitered Corners

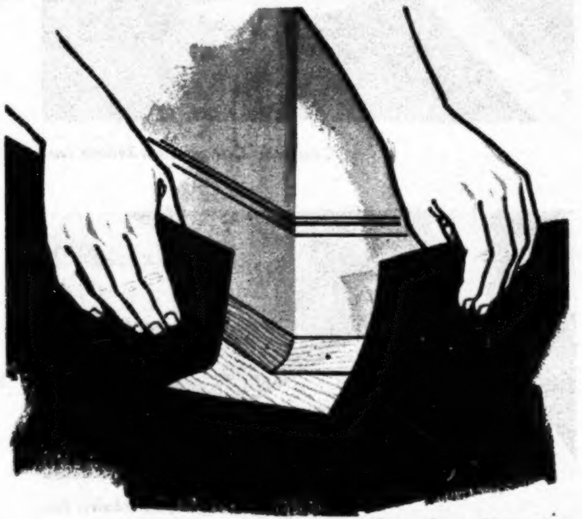
Fitting the pattern. In cutting the pattern material for a mitered corner, it is not possible to flash the material up both sides of an outside corner. Fold the felt up one side of the wall, then cut along the bottom of the lip of the cap metal to about 3/4 inch beyond the corner.

Then cut the felt downward on a 90° angle for a distance equal to that from the top of the cap metal to the bottom of the mitered joint of the cove wood. This makes it possible to flash the pattern up the other wall. Enlarge the cutout section well beyond the area occupied by the cove wood so that the pattern will lie free. Then trim the second side along the bottom of the lip. (See Figs. 71, 72, 73, and 74.)



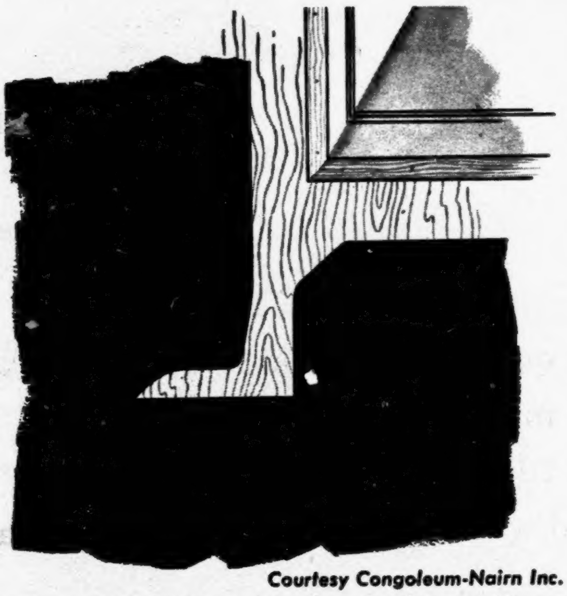
Courtesy Congoleum-Nairn Inc.

Fig. 71. Finished pattern at outside corner



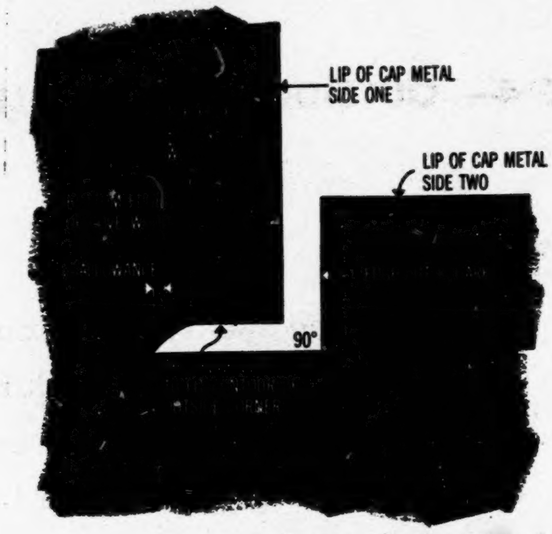
Courtesy Congoleum-Nairn Inc.

Fig. 72. Removing pattern from corner



Courtesy Congoleum-Nairn Inc.

Fig. 73. Shape of pattern in flat position


LIP OF CAP METAL
SIDE ONE
LIP OF CAP METAL
SIDE TWO
90°

Courtesy Congoleum-Nairn Inc.

Fig. 74. Identification of cuts

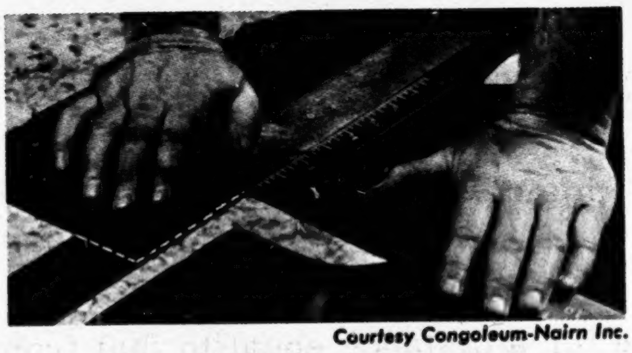


Fig. 75.

Courtesy Congoleum-Nairn Inc.

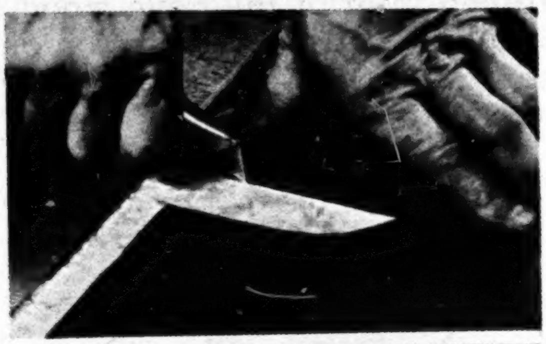


Fig. 76.

Courtesy Congoleum-Nairn Inc.

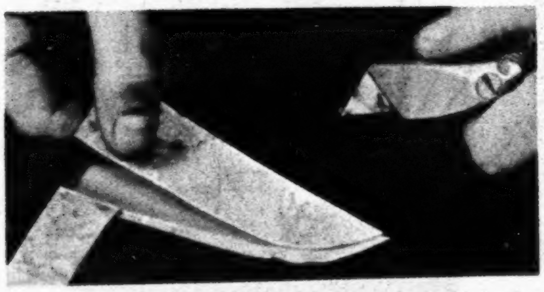


Fig. 77.

Courtesy Congoleum-Nairn Inc.

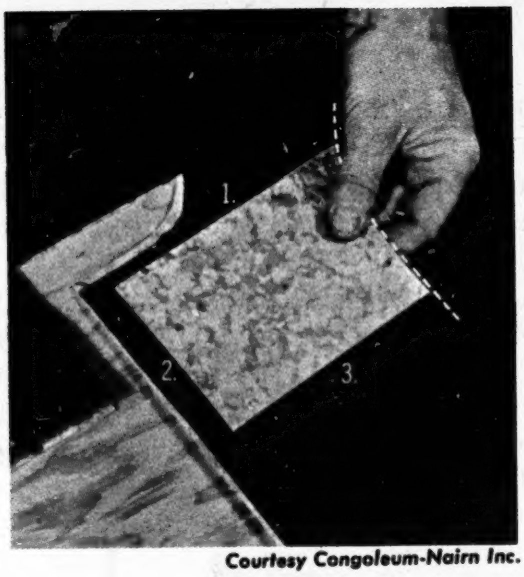


Fig. 78.

Courtesy Congoleum-Nairn Inc.

Fig. 75. Using two squares to form angle

Fig. 76. Cutting material to pattern

Fig. 77. Material exactly cut to fit

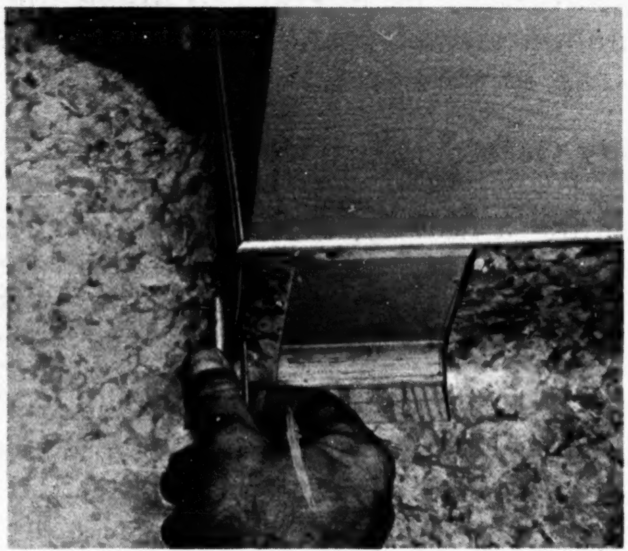
Fig. 78. Making fill from small scrap

Transferring the pattern and cutting the material. When the cove line has been transcribed to the open edge of the outside corner fill, place a small square on this line so that a perpendicular cut may be made. This cut becomes the vertical side of the corner cutout.

Place the square at right angles with this cut about 6 inches below and parallel with the cove line (Fig. 75). Make a cut along this square, as shown in Fig. 76. Cut the curved side of the cutout freehand (Fig. 77).

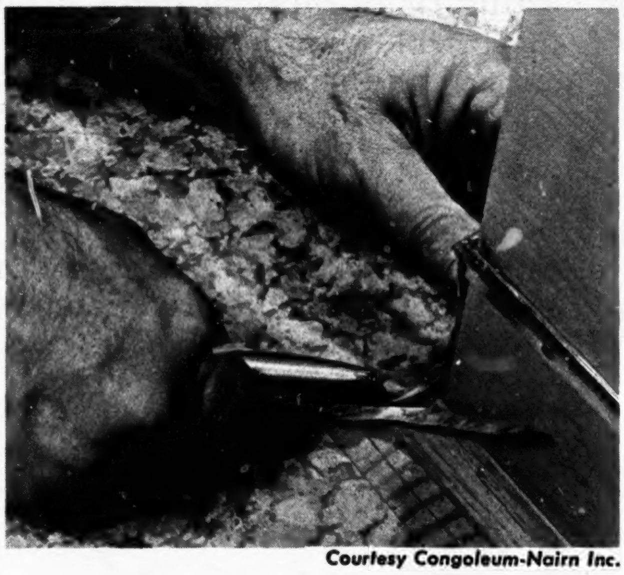
The last thing to do after transcribing the pattern is to cut the fill for the outside corner. This can be made from a small piece of scrap material. A piece 2 inches wider than the height of the cove will be needed. Score a straight line to form side 1 (Fig. 78), another at 90° from the first to form side 2, and a third parallel with side 1. Leave the fourth side longer than required, as this will be fitted later.

After the material has been rubbed into the paste, the outside corner is ready for cutting. The side that was originally cut to project beyond the corner must be cut on a miter. To do this, place a small piece of scrap against the adjoining wall (Fig. 79) and underscribe the outside corner down to approximately the middle of the cove wood.



Courtesy Congoleum-Nairn Inc.

Fig. 79. Underscribing outside corner



Courtesy Congoleum-Nairn Inc.

Fig. 80. Cutting miter corner

Cut this scribe line on a 45° angle from the top of the cove wood to the cap metal (Fig. 80). Using the miter cut in the cove wood as a guide, continue the cut to the bottom line of the cutout.

Cut a piece of felt to fit into the cutout, with the corner edge long enough to overlap the corner. Rub the felt in along the edge of the material at the corner to leave an impression line that may be used to cut the felt to an exact fit.

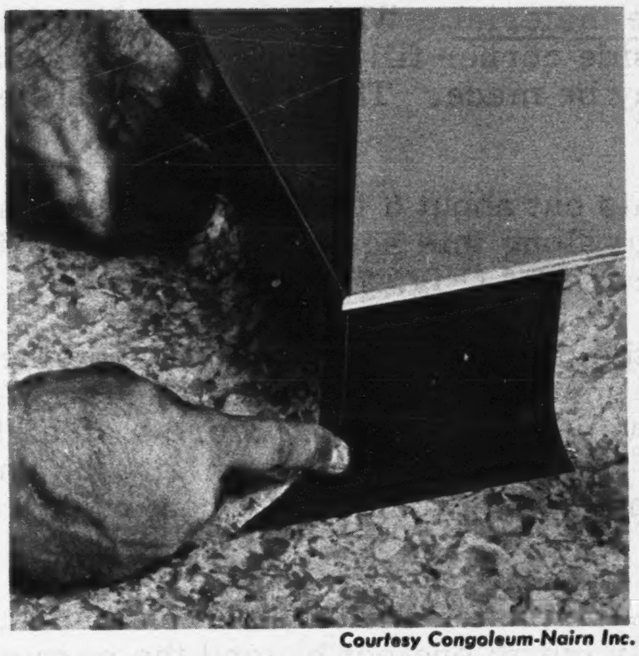

Courtesy Congoleum-Nairn Inc.

Fig. 81. **Pressing felt for exact fit**

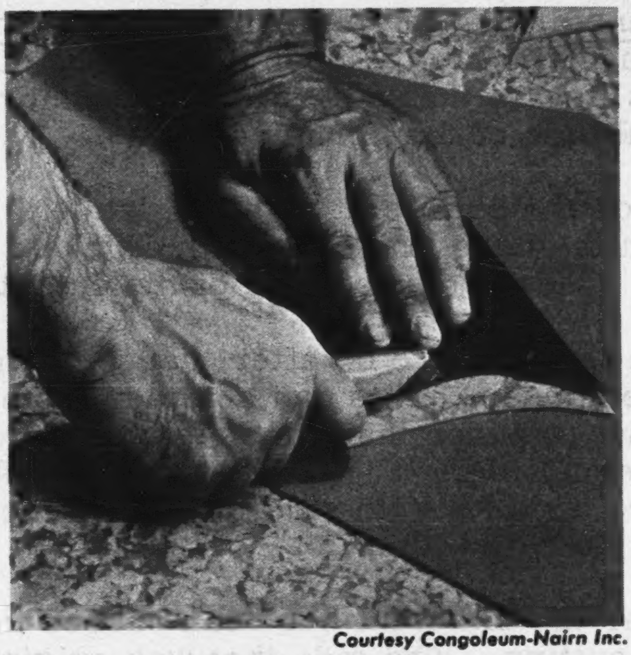

Courtesy Congoleum-Nairn Inc.

Fig. 82. **Transferring pattern**

When cutting from this pattern onto the material, be certain to make the cut with a 45° bevel. Apply paste to the finished piece, place it in proper position in the cutout, and rub it well with a wet rag to assure a firm and lasting bond.

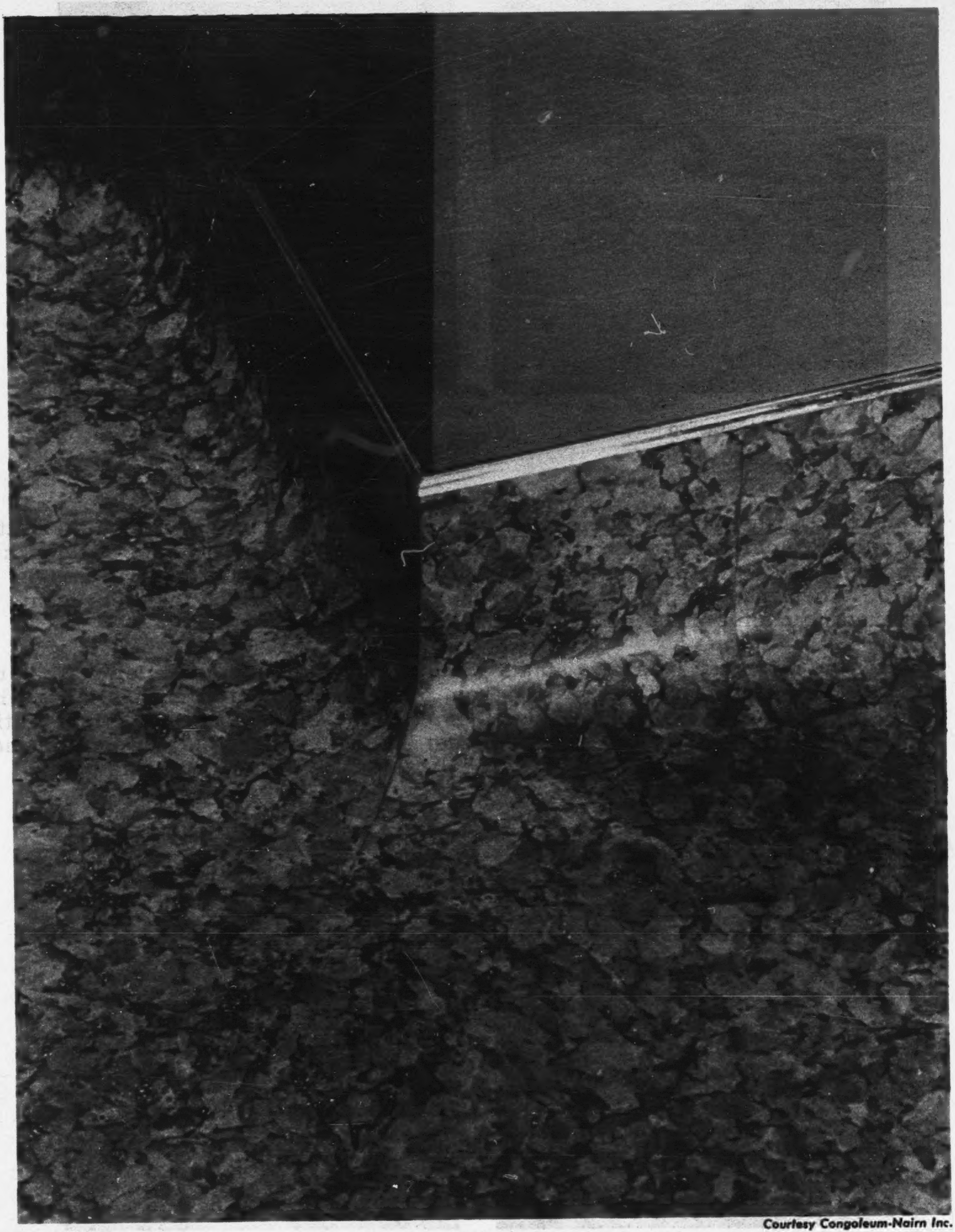
Wrap-Around or V-Plug Outside Corners

With vinyl sheet goods it is possible to make a new type of outside corner fill that eliminates the sharp mitered corner and joint. The fact that this new V-plug corner is less subject to damage than the mitered corner, along with its simplicity and good appearance, has resulted in its being widely accepted by the industry.

Preparation. When preparation is made to install a V-plug corner, it is necessary first to eliminate the sharp miter edge in the cove wood. This can be done with either a sharp utility knife or sandpaper.

Cutting pattern felt (Fig. 84). Lap the felt up one wall, then measure from the corner back along the cap metal a distance equal to the measurement from the middle of the cove wood to the cap metal. (This will be about 3-1/3 inches on 4-inch cove.) Next, make a diagonal cut from this point to the center of the cove wood in the miter. Then drop the felt around the corner to form the cove on the opposite wall. This leaves a V-shaped void at the corner, and the point of the V falls approximately in the miter of the cove wood.

Marking the pattern. The crucial point on the pattern, one which must be relocated exactly when transcribing later to the material, is a spot half-way down the curve of the cove wood and exactly at the point of the miter. Mark this point on the pattern by placing one leg of the dividers in exact position and scribing a 1-inch to 1-1/2-inch circle with the other leg (Fig. 85). Then scribe the balance of the pattern in the usual manner.



Courtesy Congoleum-Nairn Inc.

Fig. 83. Completed outside corner

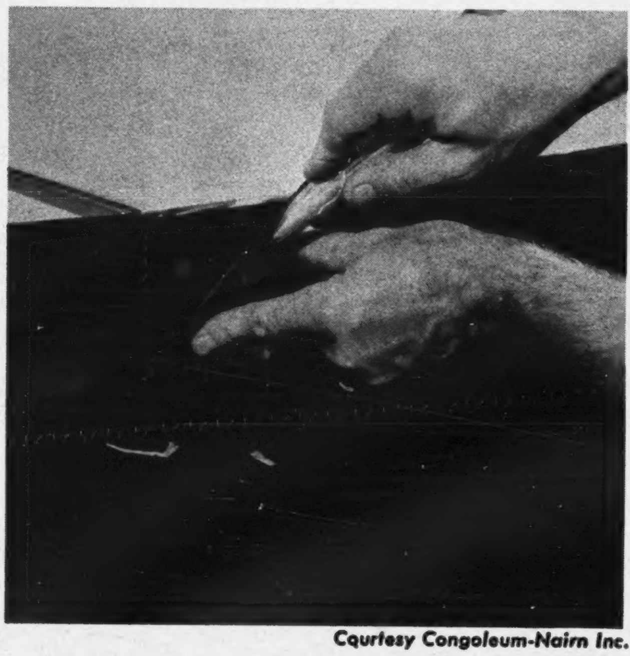

Courtesy Congoleum-Nairn Inc.

Fig. 84. Cutting felt pattern

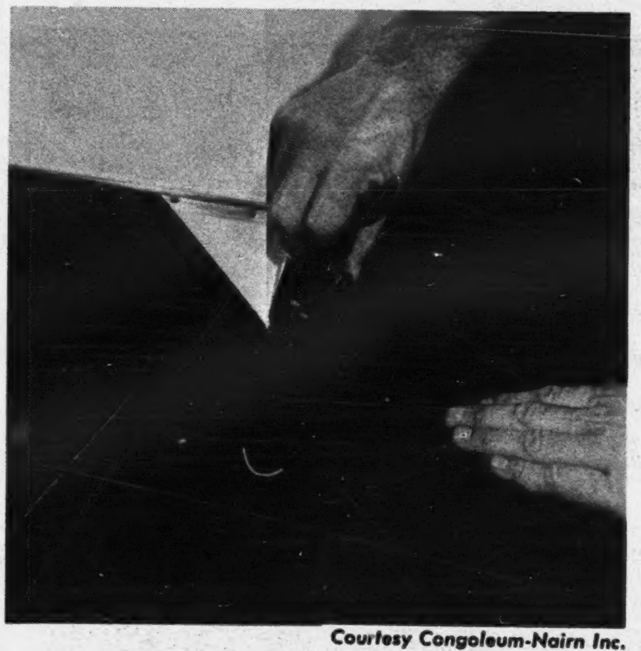

Courtesy Congoleum-Nairn Inc.

Fig. 85. Marking reference point

Transferring the pattern to the material. When the felt is laid flat on the material, the two cut edges will come together (Fig. 86) and the two scribe marks indicating the position of the cap metal on two walls intersect to form a right angle. Then transfer to the material the mark on the pattern that represents the exact midpoint of the miter.

Cutting the material. Using a small straightedge, hold the knife perfectly vertical to the material and make a cut from the reference point through the intersection of the cap metal scribe lines (Fig. 87). (Caution: During the installation of the sheet, be certain that sufficient heat is applied to the bottom point of the cutout to prevent tearing. This is critical, since the pressure at this point can be great.)

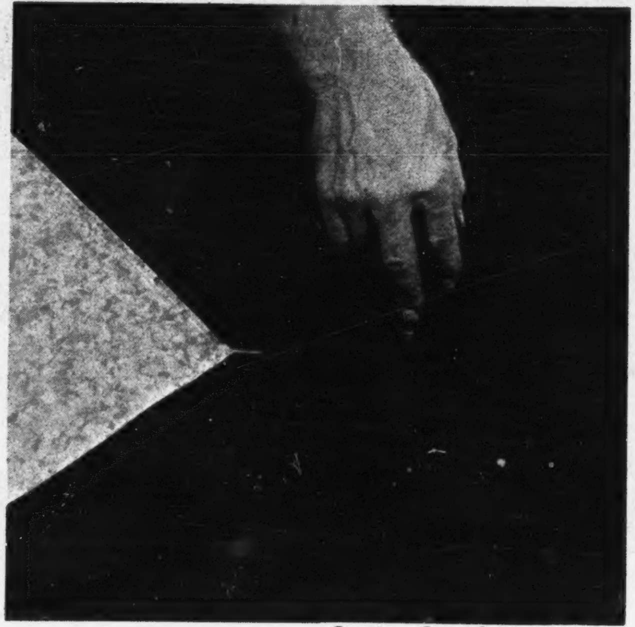

Courtesy Congoleum-Nairn Inc.

Fig. 86. Relocating reference point on material

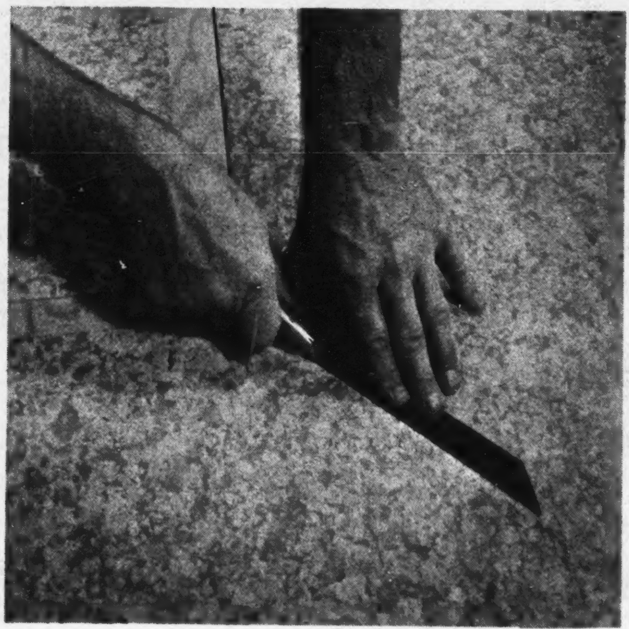
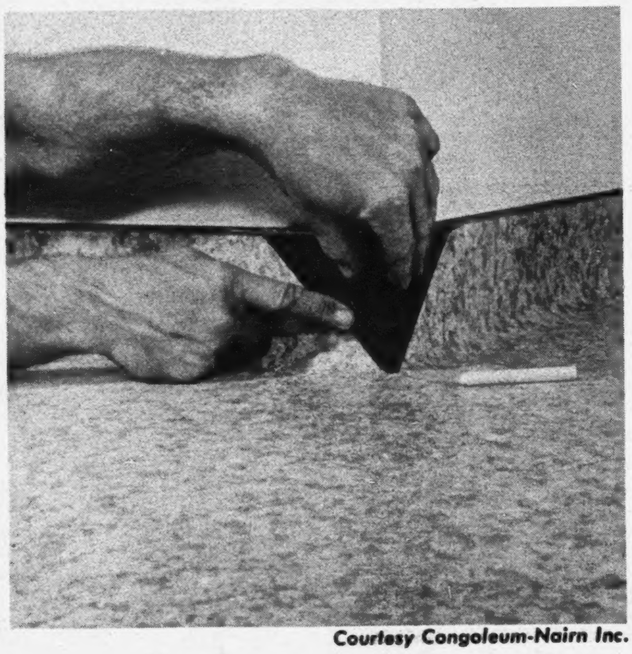

Courtesy Congoleum-Nairn Inc.

Fig. 87. Cutting scribed material

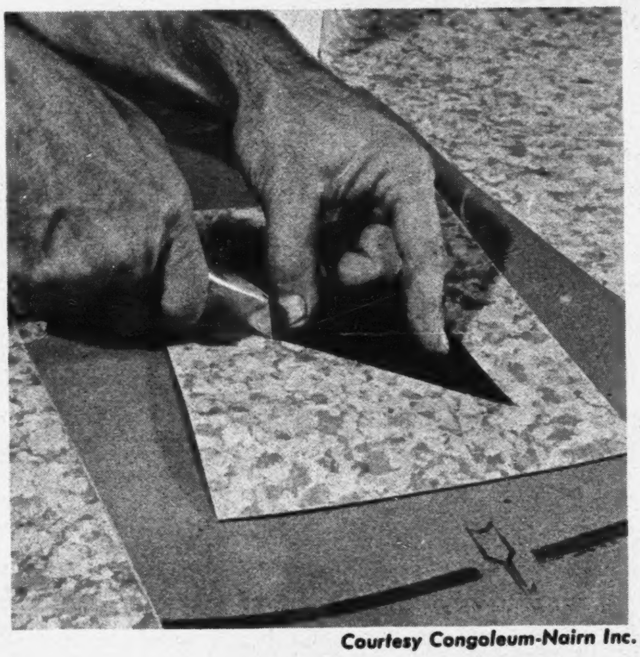
Template for fill. Crease a triangular piece of felt, cut large enough to overlap the cutout by about 1/4 inch, and place it over the cutout (Fig. 88). Rub the felt hard along the edges of the cutout and then remove it and cut along the impressed lines. This should result in a perfect template.

Cutting and installing fill. Trace the felt template onto the floor covering material and cut the material carefully along the score marks. Cut a portion of the material backing away to facilitate installation, apply paste to the corner area, and insert, heat, and rub in the fill (Figs. 89, 90, and 91).



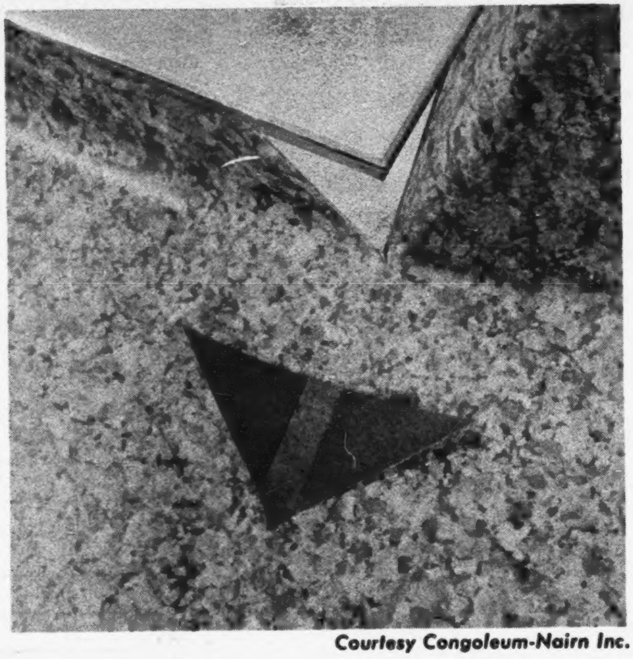
Courtesy Congoleum-Nairn Inc.

Fig. 88. Making felt template



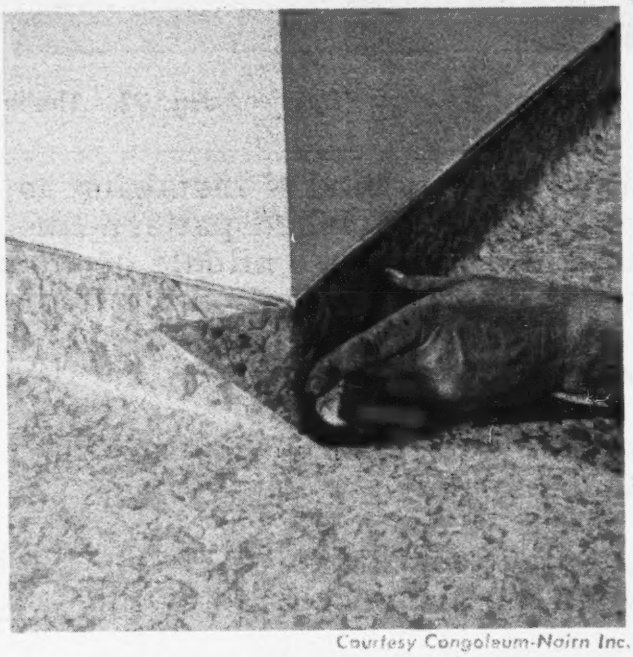
Courtesy Congoleum-Nairn Inc.

Fig. 89. Cutting material from template



Courtesy Congoleum-Nairn Inc.

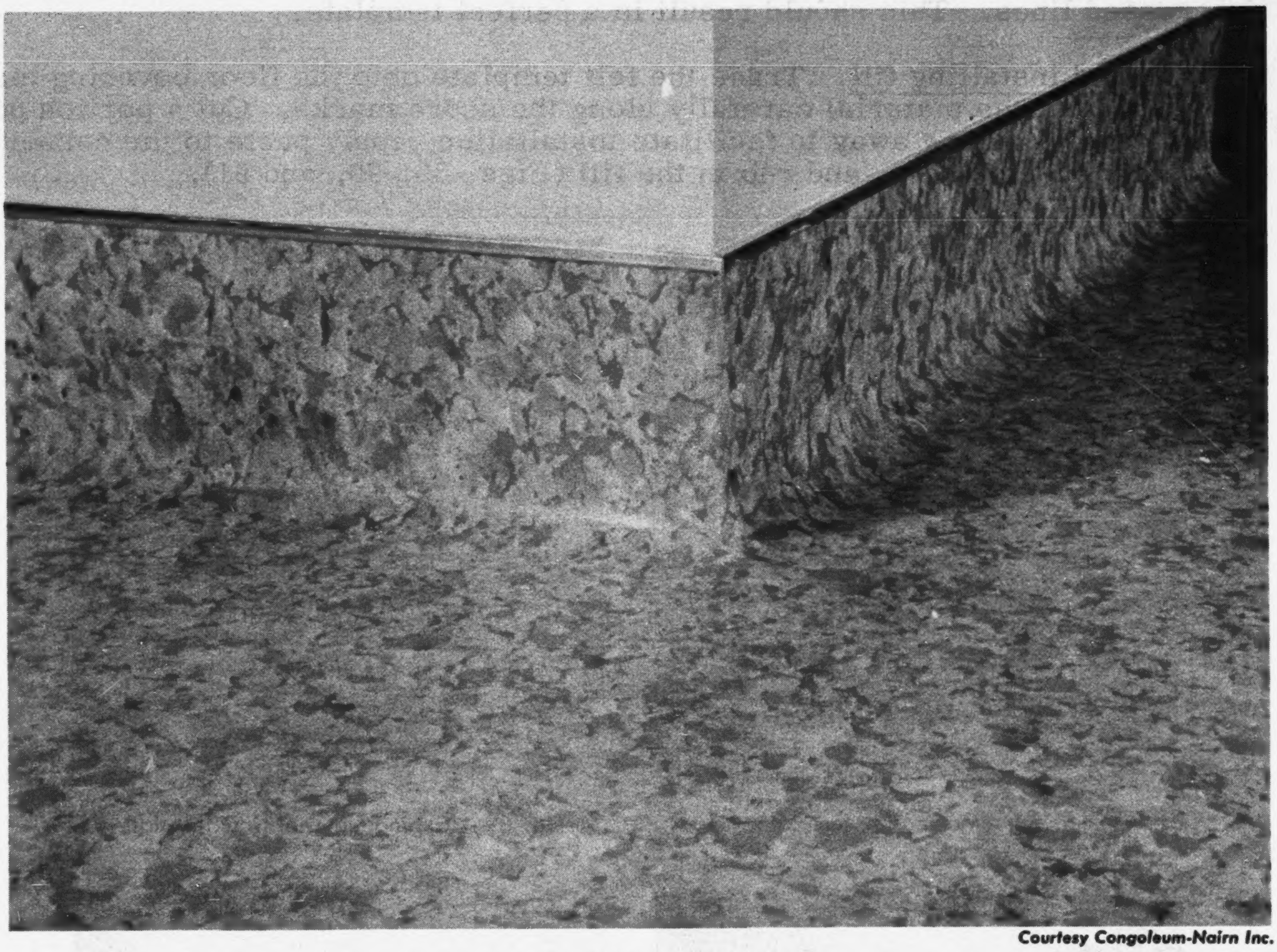
Fig. 90. Backing material partially removed



Courtesy Congoleum-Nairn Inc.

Fig. 91. Pasting corner fill into place

Finish work. Rub down the joints with a paste wax and fine steel wool. The final installation should resemble that shown in Fig. 92.



Courtesy Congoleum-Nairn Inc.

Fig. 92. The finished V-notch corner

This V-plug method of installing an outside corner can be used to some advantage also with matched-pattern linoleum by installing the fill in two pieces, with a miter from the middle of the cove wood to the cap metal. This eliminates the seam or joint on the floor surface.

Checkup

It is ___1___ to flash the material up both ___2___ of an outside corner.

The cutout section for the ___3___ ___4___ is enlarged well beyond the area occupied by the ___5___ ___6___.

In cutting out the material, after the vertical and bottom sides have been cut, the ___7___ side is ___8___.

1. __________
2. __________
3. __________
4. __________
5. __________
6. __________
7. __________
8. __________

The top cut of the piece which will be used for the fill must be ___9___ with the bottom cut.

9. __________

The precise cut to trim the first side of the outside corner is made ___10___ the material has been installed. This line is scribed with a(n) ___11___ and cut on a(n) ___12___ angle.

10. __________
11. __________
12. __________

To obtain a perfect miter for the fill, mark the pattern by pressing it against the ___13___ of the already trimmed first side.

13. __________

When the V-plug corner is used, the sharp ___14___ in the cove wood must be ___15___.

14. __________
15. __________

In marking the pattern, the crucial point is a spot halfway down the curve of the ___16___ ___17___ and exactly in the ___18___.

16. __________
17. __________
18. __________

To make the template for the fill, insert a piece of ___19___ into the opening and press along the edges of the ___20___.

19. __________
20. __________

TOPIC 5— RADIUS COVE

Introduction

- Why is it preferable to cove radius corners?
- What type of cap metal should be chosen when radius corners will be included in a job?
- What is the best material to use for cove moulding?

Although the terms "radius cove" and "radius corners" may cause one to think of the radius of a circle rather than the circumference, these terms have enjoyed wide usage in the floor covering industry over the years and have become a part of the trade terminology. The craftsman in this trade therefore thinks of the arc formed by a circular, semicircular, or rounded vertical surface, such as a wall or column, when either of the terms is used.

Although some floor covering installers still use the wrap-around method of covering radius corners, whereby the field material is scribed to the vertical surface and a flat piece is wrapped around the radius, the true professional masters the art of coving these corners.

Coving that flows in and around radius corners or semicircular walls is indeed a thing of beauty. In every trade, one feat or accomplishment marks the craftsman as an artist in his trade. In the floor covering trade, it is the ability to cove radius corners. Coving around radius corners is difficult because the floor covering material must be bent in two directions--on a vertical line from the floor and up the wall, and on a horizontal line around the radius. The result is highly desirable, for the coving protects the base from damage, eliminates dust-catching corners, and keeps the flow of coving symmetrical.

Related Information *

Careful planning is needed to apply linoleum or sheet vinyl to an outside round corner. The coving is in two parts, a separate upper section and a lower section of the field that comes up to meet it.

Cap metal. If cap metal is to be used, select one that is of light enough gauge to bend around the curve without notching or relieving the flange. A standard gauge aluminum is usually satisfactory. The cap metal on a projecting rounded corner is installed as follows:

---

*Permission has been granted to use the pictures and adapt the material in this topic from Ralph Dutter, "8-Step Guide to Radius Cove Installation," Installation Specialist, Fall Quarter, 1963.

1. Begin the installation of the cap metal by fastening one end to the straight wall at some distance from the start of the radius.
2. To prevent the lip of the cap metal from closing in while it is being bent, insert a scrap of sheet goods in the channel of the metal and then bend the metal to fit the wall.
3. When the bend is completed, remove the sheet goods and fasten the cap metal to the straight wall on the other side of the radius.

Cove moulding. A wax fillet strip is best for the cove moulding (Fig. 93), but if it is not available, regular cove wood may be used. In that case, follow these steps:

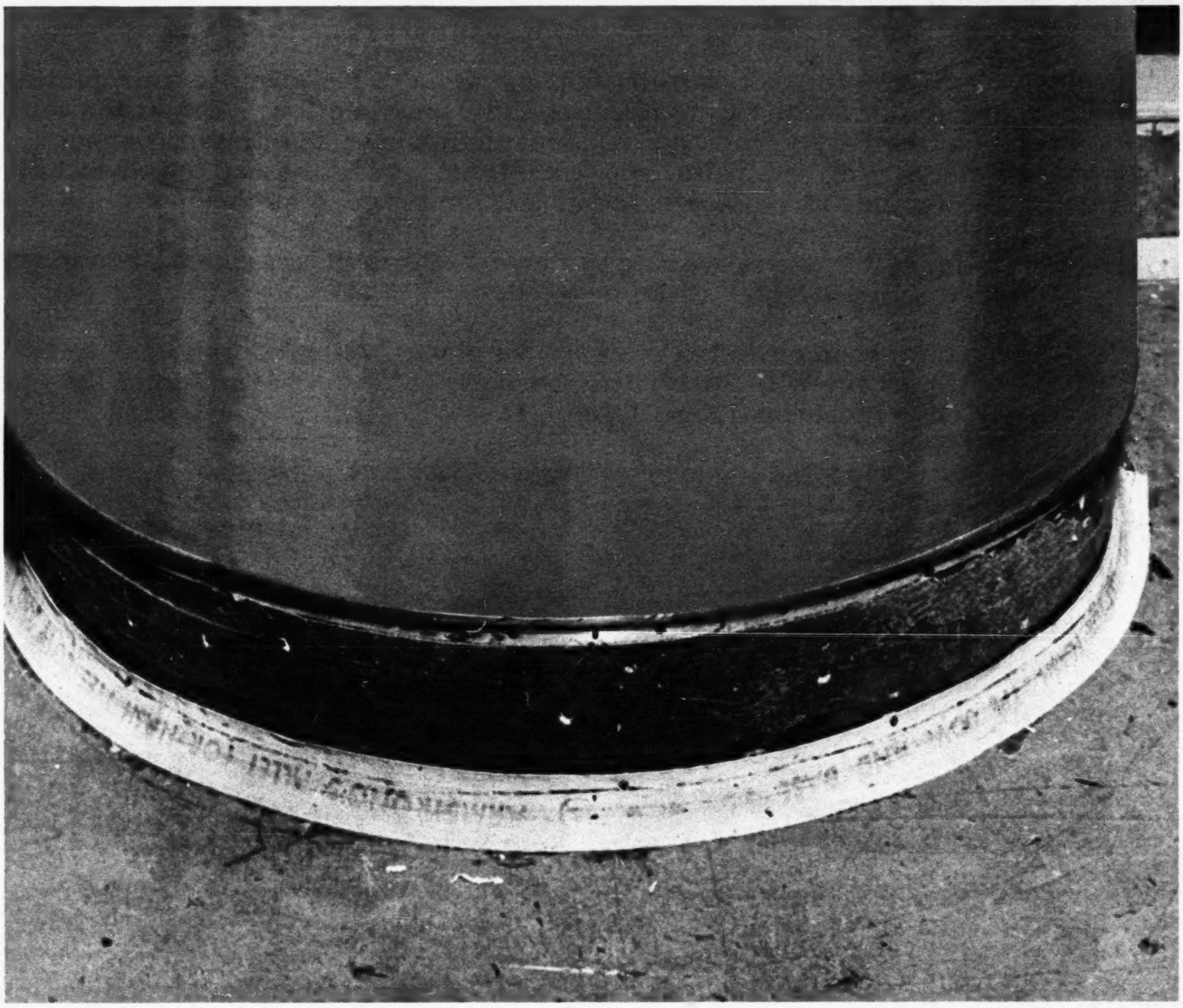


Fig. 93. Cove moulding installed on radius

1. Cut the cove wood into 1 inch to 1-1/2 inch lengths to go around the arc of the circle, stopping where the arc ends.

2. Embed these pieces as close together as possible in linoleum paste and allow the paste to dry.

3. After the paste is dry, mix a small amount of patching plaster and fill the voids between the sections of cove wood.

4. Wipe off the excess patching plaster and smooth the surface with a damp rag; then allow it to dry.

Layout. In laying out the job, decide where the seams in the sheet will fall and, if possible, arrange the lengths so that the entire round corner will come within a single length.

Fitting the upper section. Assuming that the area to be coved is a projecting round corner, the first step is to prepare the upper section. To get the length of the upper section within the radius corner, measure the distance around the rounded area. For the width, measure from inside the cap metal to 1/4 inch below the top of the cove moulding. Then proceed as follows:

1. Cut a piece of floor covering to these exact measurements, being sure to make all cuts square, not beveled.

2. Paste this floor covering material in place, using enough heat so that the bottom edge will flare out to conform with the beginning of the curve in the cove moulding (Fig. 94).

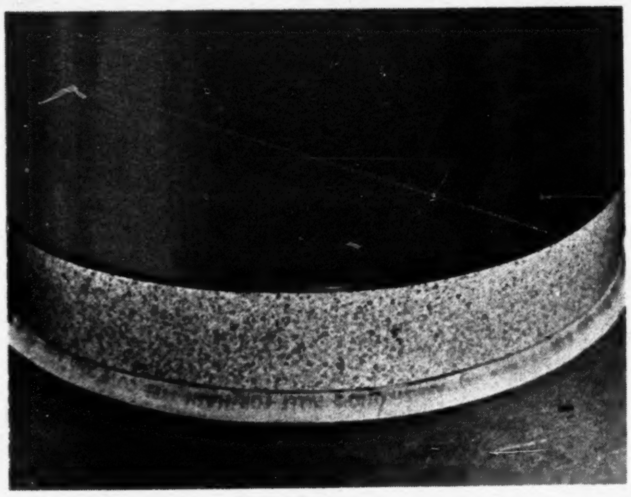


Fig. 94. Upper section in place on radius

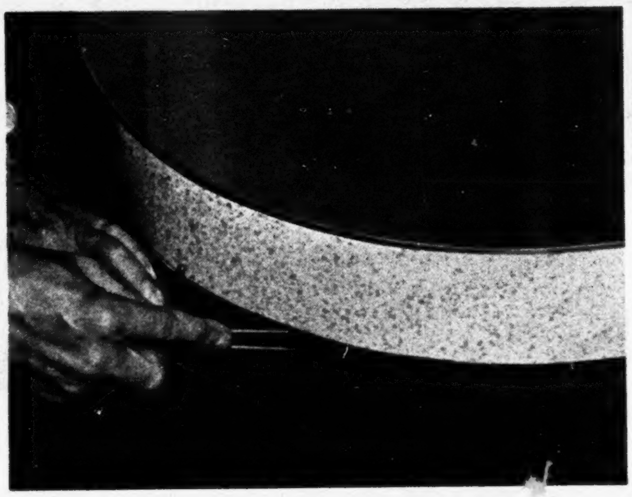


Fig. 95. Scribing the radius for lower section

Pattern scribing the lower section. Lay out the felt pattern in the conventional manner, fastening it securely at various spots, especially around the radius cove area. Around the radius, trim the felt to within 1/8 inch of the three exposed edges of the upper section (one horizontal, the other two vertical at the ends of the rounded area or the seam, in case of a column). The steps in scribing are as follows:

1. To scribe around the upper section, set the dividers at 1/4 inch (Fig. 95). Throughout the operation, be sure to hold the felt tight against the cove moulding.
2. After scribing all the pattern, remove it and fasten it onto the field material to be installed.
3. Trace the pattern onto the material.

Cutting. Cut the field material in the conventional way and, where it fits against the upper section of the radius corner, make perfectly square edges.

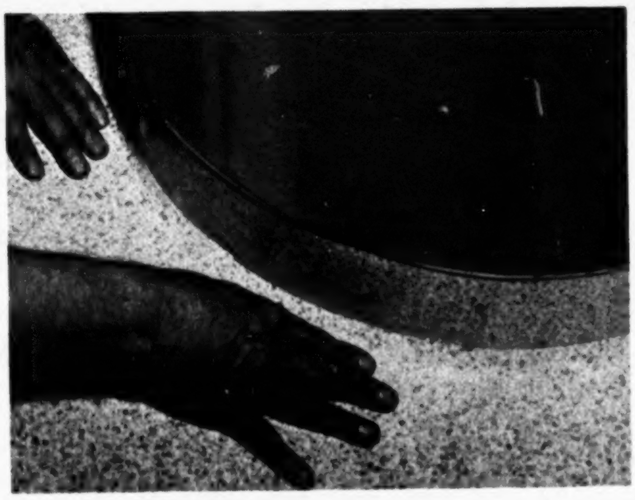


Fig. 96. Installing the lower section

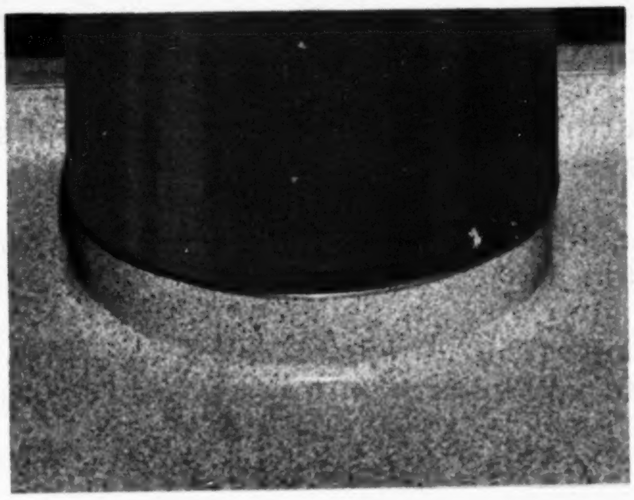


Fig. 97. Finished installation of radius corner

Installation. After the sheet has been placed and all the cove tucked in, including that meeting the vertical edges of the upper section of the radius, heat the material thoroughly. Then, using a damp rag, press the material into the cove around the radius so that the top edge of the lower section fits smoothly against the bottom edge of the upper section, all around the radius (Fig. 96). The material pressure created by the bend in the cove will now be exerted against the seam. If both edges have been cut straight and square, the result will be a nearly invisible joining of the two pieces of material.

Finishing. Apply the usual professional finishing touches. If the material used is linoleum, rub down all seams and joints with paste wax and steel wool; if it is sheet vinyl, use the electric iron and aluminum foil method. The completed job is shown in Fig. 97.

Checkup

The best way to handle a radius job is by the wrap-around method. 1. T F

Standard gauge aluminum cap metal is the most satisfactory kind for an outside corner. 2. T F

Begin fastening the cap metal in the center of the radius. 3. T F

To prevent the channel of the cap metal from closing when it is bent, insert a scrap of material in the channel. 4. T F

The best material to use for the cove moulding is regular cove wood. 5. T F

In laying out a radius cove job, it is desirable to plan a seam at the exact center of the radius. 6. T F

The width of the upper section of a radius cove is established by measuring from inside the cap metal to 1/4 inch below the top of the cove moulding. 7. T F

In cutting the upper section, make the cuts perfectly square. 8. T F

To scribe around the already installed upper section, set the dividers at 3/4 inch. 9. T F

If sheet vinyl is used as cove material, rub down all joints and seams with paste wax for the finishing touch. 10. T F

TOPIC 6— BORDER COVE

Assignment

Installation Manual, Armstrong Cork Co., Chap. 14, sections on "Pattern Scribing" and "Corners Without Metal Pieces."

Introduction

- How does border cove differ from top-set cove?
- In border cove installations, when is the field material laid?
- How does the installer determine the dimensions of border cove?

In addition to a top-set base or a self-cove finish, resilient floor covering is sometimes finished with a border cove. Although the end results are basically the same, the procedure for installing border cove differs considerably from that for other finishes.

Related Information

Trimming the field. Even though the field material is laid before the border cove, the cove wood and cap metal are installed first (see Topic 2). The field material, instead of being fitted to the wall or other vertical surfaces, is stopped approximately 2-1/2 inches from such surfaces. After the field area has been fitted, cemented, and rolled, it is ready to be trimmed.

Fig. 98 shows a composite corner to illustrate one method of trimming the field. Cut two strips of linoleum approximately 1-1/2 inches wide and long enough to overlap the field when the strip is in place in the groove of the metal. The distance from the wall at which the field should be trimmed can be varied; however, the accepted rule is that unless otherwise specified, the distance out from the wall should be the same as the distance up the wall. One thing to keep in mind is that if the cove is a different color from the field, the farther from the wall the field is trimmed, the smaller the floor area will appear to be.

Using the straightedge and linoleum strips, as shown in Fig. 98, trim the field around the entire room. Measurements with the linoleum strips should be taken at least every 24 inches around the room to insure against loose or extra tight spots along the cove.

Scribing the inside corner. For the inside corner, the actual piece to be used may be scribed. Often, however, it is better to make a pattern from a piece of 30-pound saturated felt approximately 15 inches long and to transfer the result onto the floor covering. Scribing the corner with an overscriber differs

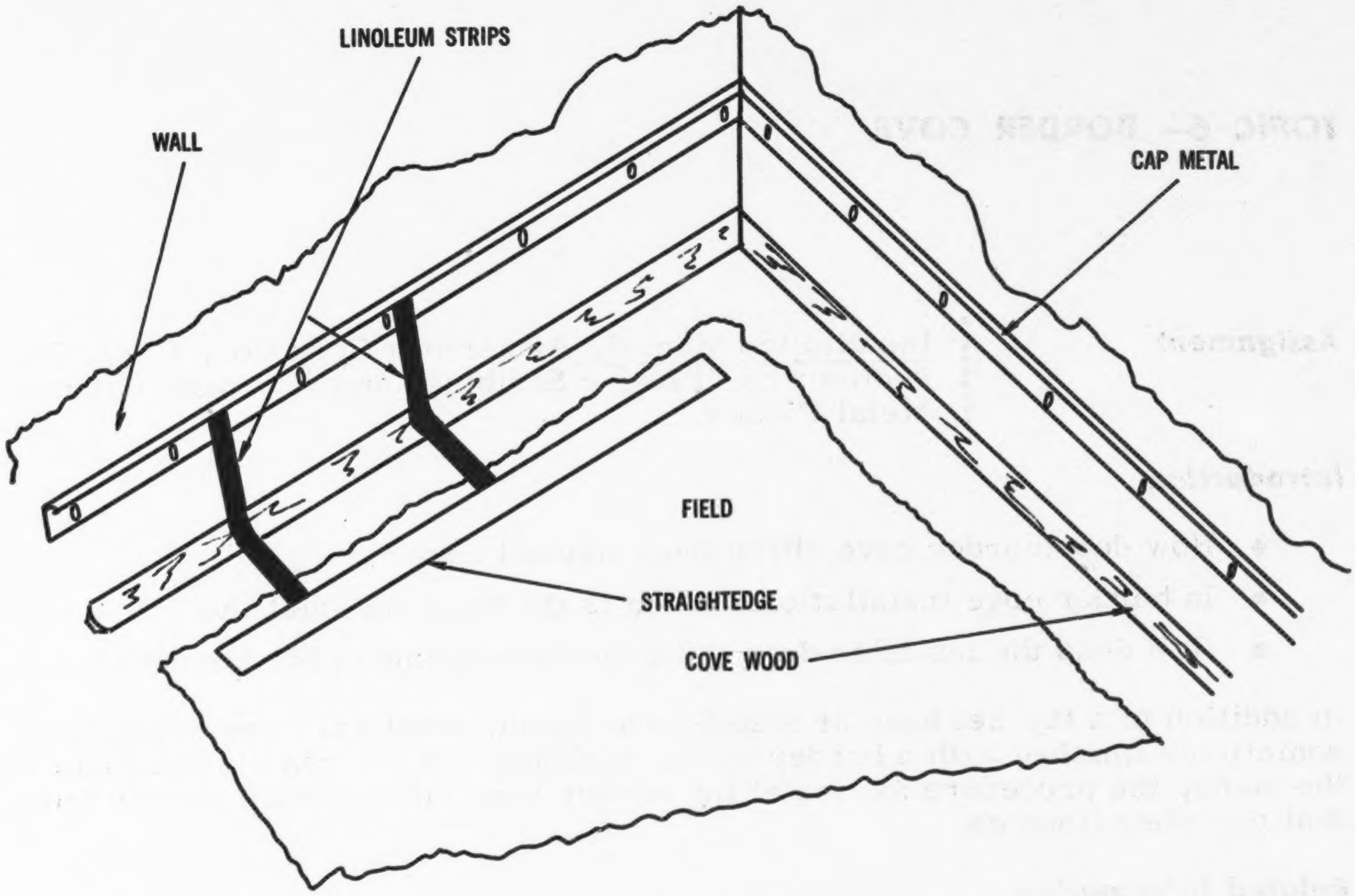


Fig. 98. Trimming of field

from conventional pattern scribing in that the fit is obtained directly from the pattern rather than by transcribing. In other words, cut the pattern along the scribe line, trial-fit it into position, and then make whatever adjustment is necessary. Then lay the pattern directly over the cove material and cut along the outside of the pattern. Fit both ends of the cove material in this manner, taking into account the actual length of the wall. Next, cement and fit them into place.

In scribing either side of the corner, run the scribe mark to the bottom of the cove wood only, allowing both pieces to lap from that point to the junction of the strip with the field. When the second piece has been fitted, cement and set it in place. Then use a small straightedge as a guide to cut a miter from the bottom of the cove wood to the field.

Scribing the outside corner. In making the miter for an outside corner, remember to take the thickness of the material into consideration. Before scribing the first side of the corner, insert a scrap piece of material against the wall to represent the second side. Then cut the material along the scribe mark, with the heel of the knife kept pointing directly at the corner of the field. This puts a 45° angle on the cut. When the knife reaches the top of the cove wood, allow its blade to follow the small space between the two pieces of cove wood. Again, allow the material to lap from the bottom of the cove wood to the field.

Fit the other side of the corner in the same way, except that this time the small piece of material against the wall need not be used.

Checkup

For most border cove installations, the field should be laid to within 2-1/2 inches from the wall. 1. T F

A wide, contrasting border cove tends to make the room look larger. 2. T F

If the cove is to snap-fit and the linoleum strip method is used, measurements should be taken every 6 feet around the room. 3. T F

Using a pattern for fitting inside cove corners is more accurate than scribing directly to the material. 4. T F

If cove is cut oversize in width, an overscriber should be used to fit it to the field. 5. T F

For cutting miters on floor sections of the corners, the installer should use a small straightedge as a guide. 6. T F

Inside corners should be scribed from the cap metal all the way to the field. 7. T F

To make allowance for the miter for an outside corner, a double thickness of material is placed against the adjoining wall as a guide for the corner scriber. 8. T F

When cutting along a scribe mark on an outside corner, the installer should hold the knife at an angle of 180° to the cove. 9. T F

The field area must be cemented in place before its edges are trimmed. 10. T F

A small pin vise is a good aid for cutting miters in cove installation. 11. T F

Both wall and floor areas should be cemented to ensure the best job. 12. T F

The height of the cove varies with the requirements of each particular job. 13. T F

The tool used to make or fit inside corners is called a hinge scriber. 14. T F

The procedure for installing border cove is exactly the same as that for self-cove. 15. T F

unit H

SPECIAL JOBS

Aside from the general, everyday type of job the floor covering installer is called upon to perform, demands are frequently made upon him to make special installations or to work with other than ordinary materials. The competent journeyman is familiar with these facets of the work and has made it a point to keep abreast of all new materials and techniques of application.

It is not uncommon these days for a home installation to require such items as coved tile, counter top covering, and wall covering. In addition, special sheet materials, factory and custom-made insets, and the commercial installation of static conductive floors all offer a challenge to the floor covering installer.

Familiarization with all aspects of the trade is a prerequisite to becoming a skilled journeyman. This unit presents some of the special jobs the journeyman may expect to encounter from time to time, along with the materials and procedures used to perform these jobs.

TOPIC 1— COVING TILE

Introduction

- How does the installation of cove tile differ from that of border cove for sheet material?
- How are the problems presented by uneven wall and floor surfaces handled?
- How is cove tile scribed so it will form a perfect fit when cut?
- What is the best method of bending tile to follow the cove line?

The art of coving tile requires both skill and patience. The more uneven the walls and floor, the greater the skill and patience required, for uneveness in either instance must be compensated for if gapping and overlapping seams are to be avoided. And unless these are avoided the job will be less than satisfactory.

The steps in coving tile are as follows: (1) making adjustments for bulges or hollows; (2) laying out the border; (3) installing cap metal; (4) laying the field; and (5) measuring, cutting, and installing the border.

Related Information

Adjustments on walls and floor. Many construction factors must be taken into consideration before a tile coving job can be started, and one of the most important is the straightness of the walls to be coved. An outward bulge causes

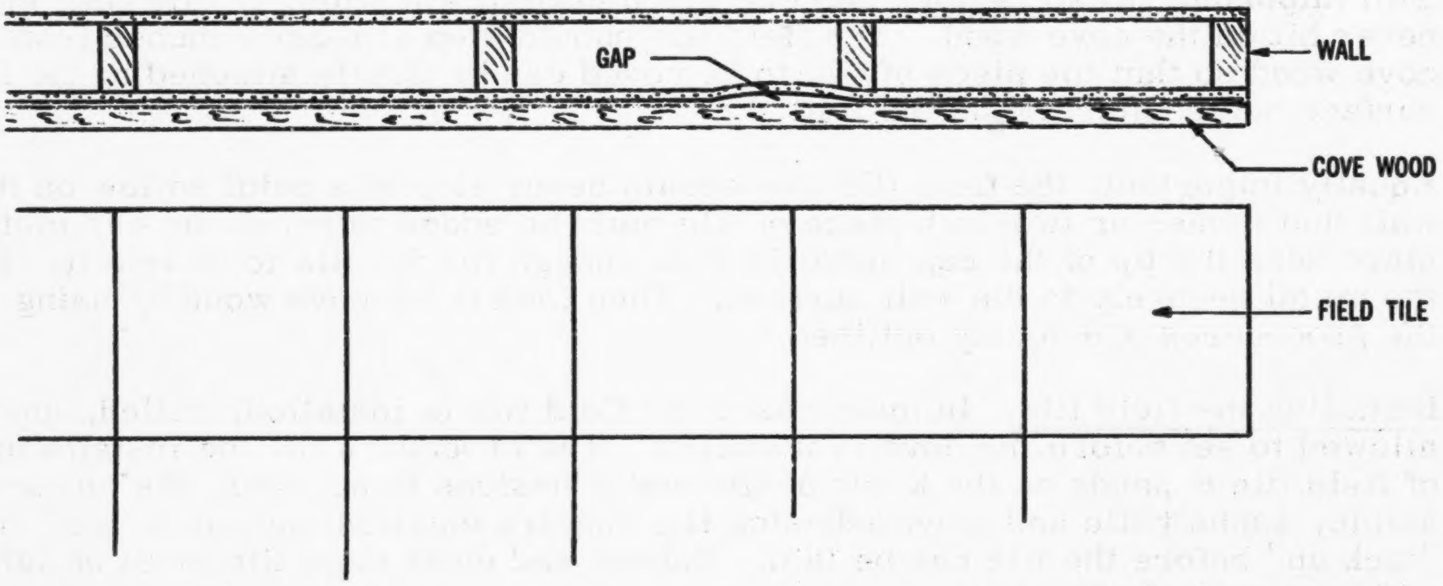


Fig. 99. Indented wall

a crack or opening to appear between tiles at the top edge of the border; an inward curvature causes an overlapping of tiles and necessitates trimming one or both adjacent tiles.

The unevenness of floors is another factor to be considered. An example is the high and low rolling effects that are characteristic of concrete floors. Crack filler can be used to fill in indentations along wall lines.

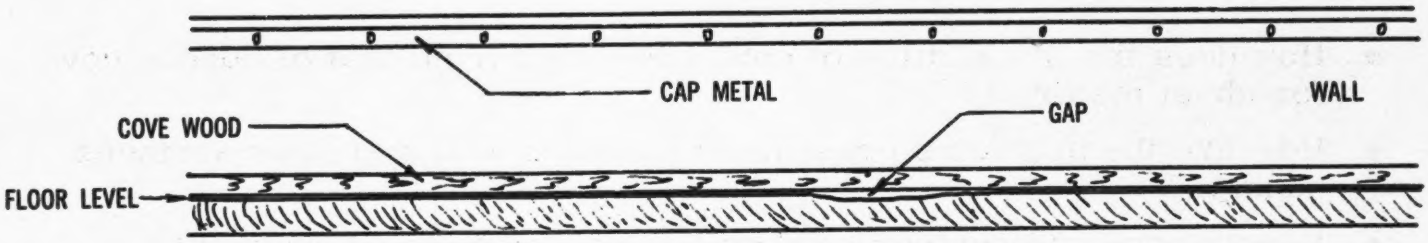


Fig. 100. Indented floor

In many instances the cove line can be straightened by the proper installation of cove wood. In these installations the cove wood is butted against the outward bulges and nailed as it lies in a straight line. Slight gaps are thus left between the wood and wall, but one problem caused by construction defects is thus corrected. In all instances, such defects pose problems that must be solved in one way or another if the coving is to be well done.

Layout and cap metal installation. In most cases the tile layout methods explained in earlier topics can be employed even though metal cap is used. It is recommended that the cap metal be installed first so that it will hold the tile securely in place as it is laid. The height of the cap metal is determined by the tile layout. For example, if a full tile fits up the wall exactly 2-1/2 inches, or any similar reasonable cove dimension, then the tile layout itself determines the height of the cap.

Two important layout factors must be given careful attention. A tile line should never hit on the cove wood. The field tile should stop at least 2 inches from the cove wood so that the piece of tile to be coved can be firmly attached to the floor surface before starting up the wall.

Equally important, the field tile line should never stop at a point so low on the wall that a one- or two-inch piece of tile must be added to reach the cap metal. Make sure the tip of the cap metal is wide enough for the tile to fit into it. Fit the metal securely to the wall surface. Then install the cove wood by using the procedures previously outlined.

Installing the field tile. In most cases the field tile is installed, rolled, and allowed to set before the cove is installed. The procedure for the installation of field tile depends on the kinds of tile and adhesives to be used. As an example, asphalt tile and vinyl asbestos tile require mastics that must "set" or "tack up" before the tile can be laid. Rubber and most vinyl tile must be laid with waterproof adhesives.

Measuring and cutting the cove tile. The width required for the tile to be coved varies because of irregularities in wall and floor, so it is not feasible for an overall measurement to be taken and the tile for the entire wall cut from this one measurement. Instead, the width required for each tile should be determined and tile cut accordingly. The completed job will reflect the care it has thus been given.

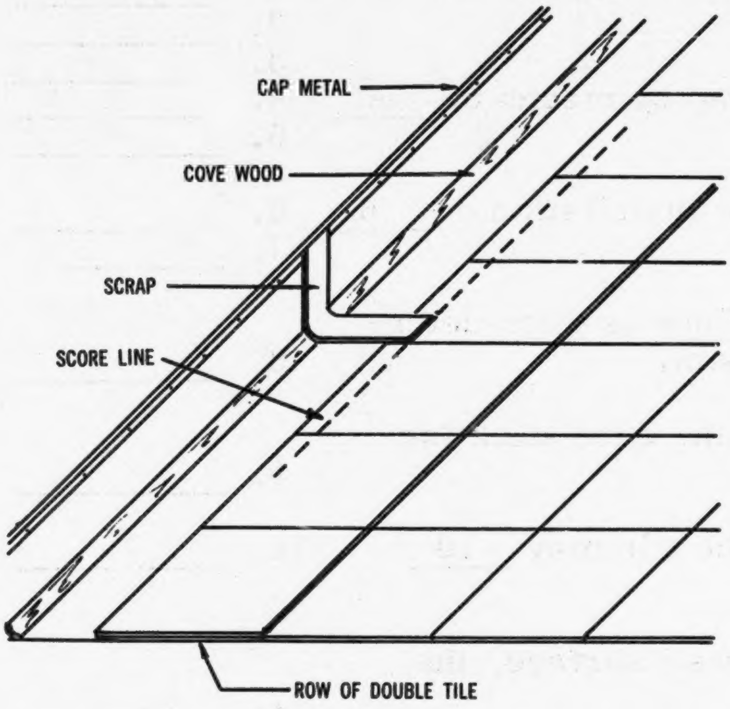


Fig. 101. Marking coving title for cut

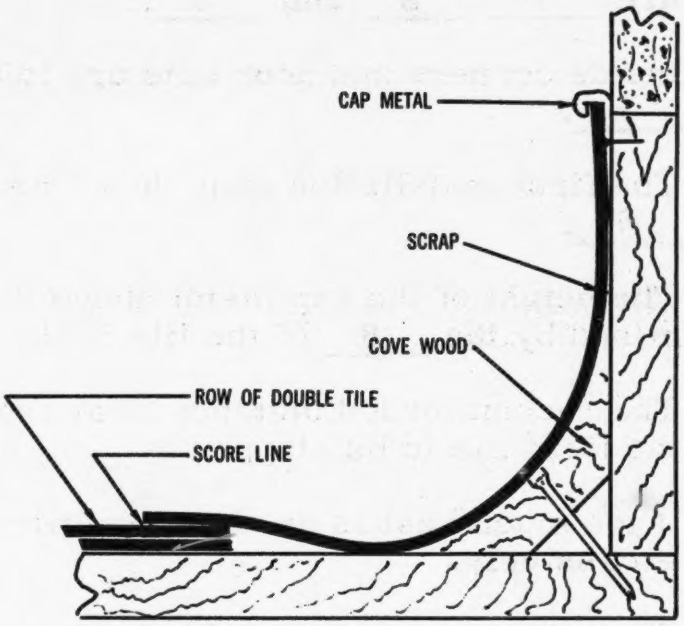


Fig. 102. Cutaway view of wall and floor

A scrap of tile an inch or two wide can be used to measure the width required at each joint in the field tile. Lay the tile to be coved exactly over the last row of field tile. Fit one end of the scrap piece into the cap metal and rest the other end on top of the tile. Mark each tile as the scrap is moved along the wall. A perfect pattern of the contour of the wall is thus produced. Always hold the scrap piece securely under the cap metal (see Figs. 101 and 102).

Installing the cove tile. After measuring and cutting all the cove tile, proceed to spread the adhesive on all the areas to be coved, except the inside and outside corners. One possible exception to this rule occurs when the adhesive used requires a prolonged set-up time; then all surfaces to be covered may be spread at the same time.

Some installers prefer to insert every other cove tile, then the others. This procedure makes it easier to maintain proper alignment of joints, even though the slight heating of the coved tile (to make it bend more easily) tends to expand it. The use of excessive heat should be avoided, for it may cause tile to shrink too much. Only rubber tile can be coved without using heat.

When all the cut tile is in place, roll it properly and clean off any excess adhesive showing on tile, metal, or wall surfaces.

All inside corners and door cuts can be installed in one piece by pattern scribing. Outside corners are installed in the usual manner.

Checkup

Two structural defects that cause trouble in coving tile are ___1___ ___2___ and ___3___.

1. ____________
2. ____________
3. ____________

Inside corners and door cuts are laid out by means of ___4___ ___5___.

4. ____________
5. ____________

The first installation step should be the installation of ___6___ ___7___.

6. ____________
7. ____________

The height of the cap metal above the floor is often determined by the ___8___ of the tile in the room.

8. ____________

The recommended distance away from the cove stick for the field tile to be stopped is ___9___.

9. ____________

If too much heat is used to cove tile, the tile may ___10___ excessively.

10. ____________

When there is an outward bulge in the wall surface, the result will be a(n) ___11___ in the tile.

11. ____________

Unevenness of walls can sometimes be compensated for by correct placement of ___12___ ___13___.

12. ____________
13. ____________

Hollows in floors can be filled with ___14___ ___15___.

14. ____________
15. ____________

Group Discussion

1. Why is the field tile installed first?

2. Why is it advisable to measure each coved tile separately?

TOPIC 2— COUNTER TOPS

Assignment Installation Manual, Armstrong Cork Co., Chap. 21.

Introduction

- What materials are considered best for use on counter tops? What materials should be avoided?
- How are edge mouldings applied?
- What clearances must be considered in making sink cutouts?
- What are the two most frequently used finishes for counter tops?
- How is a sink installed when a T-type rim is used?

Experience installing resilient floor covering on floors helps the installer acquire much of the knowledge and most of the skills used in counter top installation. However, in making such an installation, he must exercise even greater caution and care, for the counter will be used at eye level where even the slightest flaw in its surface will be obvious.

Related Information

Counter top materials. Some manufacturers produce materials especially designed for counter tops, most of which have a vinyl surface with an asbestos back. Some floor coverings work very well for counter tops.

The use of a dry, paperback material for counter tops should be avoided where water is to be present, because water leaking through a seam will cause the paper to rot and destroy the installation. Asbestos, on the other hand,is damaged very little by water.

Adhesives. The adhesives used for installing counter tops should be those generally recommended by the manufacturers of the materials installed. A good waterproof cement should always be used where water is to be present, especially in the area around a sink. On the rolled or curved surfaces, a contact cement of a transparent or clear type may be used to best advantage. Some contact cements contain a green stain that penetrates the back of the material and shows through the clear vinyl surface. These should be avoided.

A 2-inch paint brush is commonly used to apply contact cement. This can be kept in good working condition if it is stored in a container of water between installations. The water keeps the cement from setting.

In installing the surface material, avoid overlapping one kind of adhesive onto another, for if they are not compatible, no bond will be formed.

Types of finish. The two most frequently used finishes for counter tops are:

1. A square or a rolled front edge with a flash cove backsplash that is either trimmed with cap metal or fitted up to cabinets and window sills.
2. A rolled front edge with a rolled edge above a flash cove back- or endsplash.

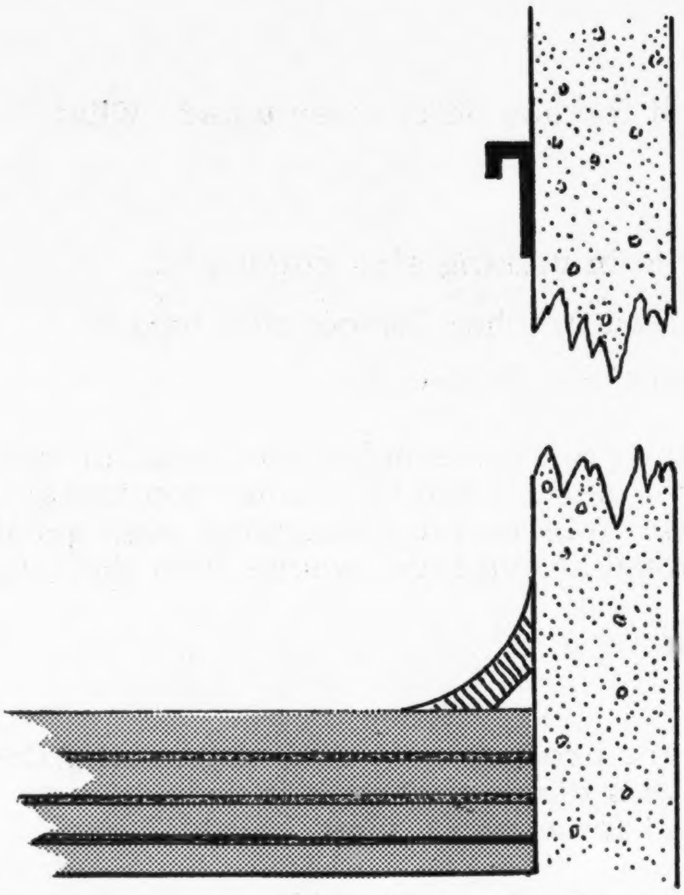


Fig. 103. **Back splash with cap metal**

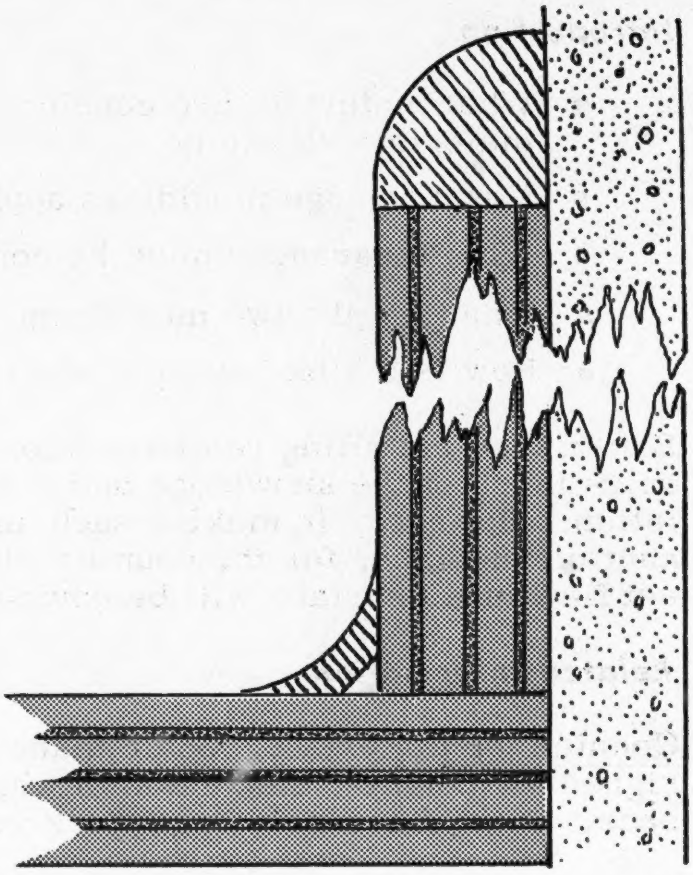


Fig. 104. **Back splash with quarter round**

Base construction. The base for a counter top where water is to be present is constructed of 3/4-inch waterproof plywood. If the top is to have a rolled edge, it may even be advisable to use 7/8 inch plywood. Fasten the base securely to the cabinet frame. If countersunk screws or nails are used from the top, fill the holes and sand the surface.

In making some installations, the installer makes the sink cutout and sets the edge mouldings. (After the material is installed, he may also set the sink.)

To make the sink cutout, mark the lines to be cut by using the sink rim or template provided for the sink to be installed. Allow 1/8 inch between the sink and the plywood, and make the cutout so that the sink will be at least 3 inches from the backsplash. Make the cutout by cutting the straight lines with a portable circular saw and the curved lines with a saber saw. If a round cutout is required, first use the portable circular saw to make a straight cut across the area to be removed. Then start a saber saw in this cut and saw out each half of the cutout.

In preparing to set the edge mouldings, use a circular saw to cut the plywood top back 1/2 inch from the edge of the cabinet. Cut the mouldings in a miter box. Set them in place with contact cement, then nail them with 2-1/2-inch or 3-inch finishing nails. Cutting back the plywood and cementing the mouldings in this way add extra strength to the mouldings.

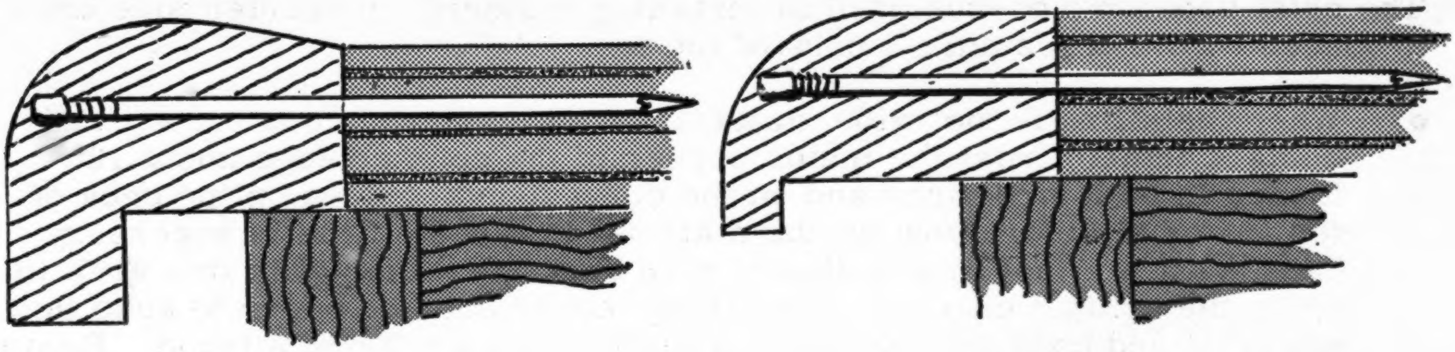


Fig. 105. Typical edge mouldings for ¾" plywood

Inspect the plywood surface and the mouldings. Fill any holes or irregularities. Sand all joints in the top until they are smooth. If the joints are open, fill them with hard-drying filler before sanding. Be careful in sanding plywood to keep the sander from cutting through the surface.

Plaster preparation. If metal cap strip is to be used at the top of the backsplash, inspect the plaster to be covered. Fill holes, indentations, nail and screw holes, and cracks with a nonshrinking plaster compound. Sand the patched areas smooth so that no imperfections will show through the covering.

Layout. Most counter tops are made to fit by pattern scribing. Certain procedures required in making the layout of a sink top follow:

- If cap metal is to be applied, use a level to draw a line above the counter top at the height desired. If the metal cap is installed on a line determined by measuring from the counter top, the cap metal line will be on a slant if the counter is not level.
- Use a level to mark the horizontal line for the top of the end splashes and the vertical line from the outside edge of the counter top to the horizontal line. The appearance of an installation may be less than satisfactory if this procedure for marking is not employed.
- When water is to be present, place the seams as far as possible from the main source of the water, or from where the water will be used most frequently.

Installation. Once the material has been set in place and the contact cement applied, insert butcher paper or lining felt between the material and the surface to be covered in order to delay the formation of a bond until the cement is dry. When a bond is desired, remove the paper or felt.

In pressing materials on areas covered with contact cement, press from the back of the installation toward the front edge so that bubbles or ripples will be forced out. In pressing materials on a nondrip moulding, first press the material into the low point or dip in the moulding. Otherwise the material may be suspended between the high point of the moulding and the flat surface of the counter.

The chief problems encountered in installing material on counter tops are produced by the edges and corners of the tops.

- When installing 6-foot wide material on an L-shaped counter, spread contact cement from the inside corner of the counter edge about 18 inches in both directions and on the corresponding area on the back of the material before you set the material in place. This is necessary because it will not be possible to turn back the material in this area to apply the contact cement. Use lining felt or butcher paper to keep the material and base from bonding while the two are being aligned. Remove the felt or paper when the bond is desired.
- The edge of the inside corner of an L-shaped or U-shaped counter presents a cutting problem. Cut the material at a 45° angle from the inside corner and add two pieces of material to fill out the corner as shown in Fig. 106.

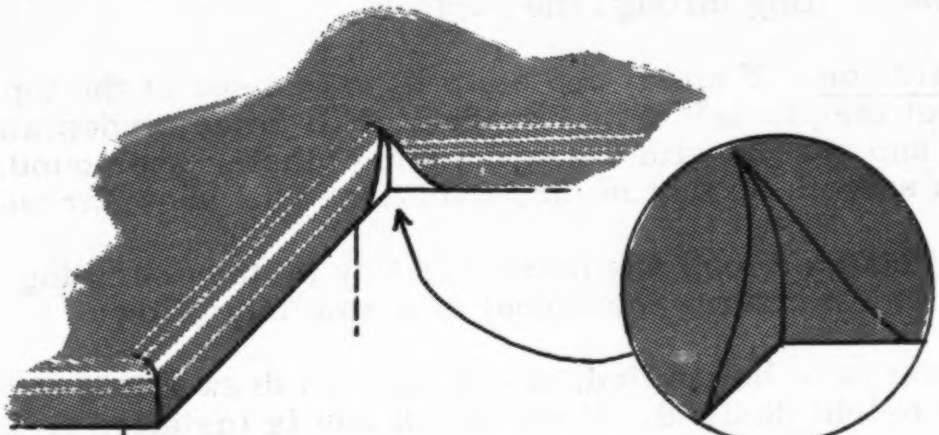


Fig. 106. Inside corner on counter edge

- The inside corner of the rolled edge above a backsplash is difficult to complete because the material that comes in contact with the wall must be "freehanded" or "knifed" to a fit. Therefore, sufficient material must be left for this purpose (Fig. 107).

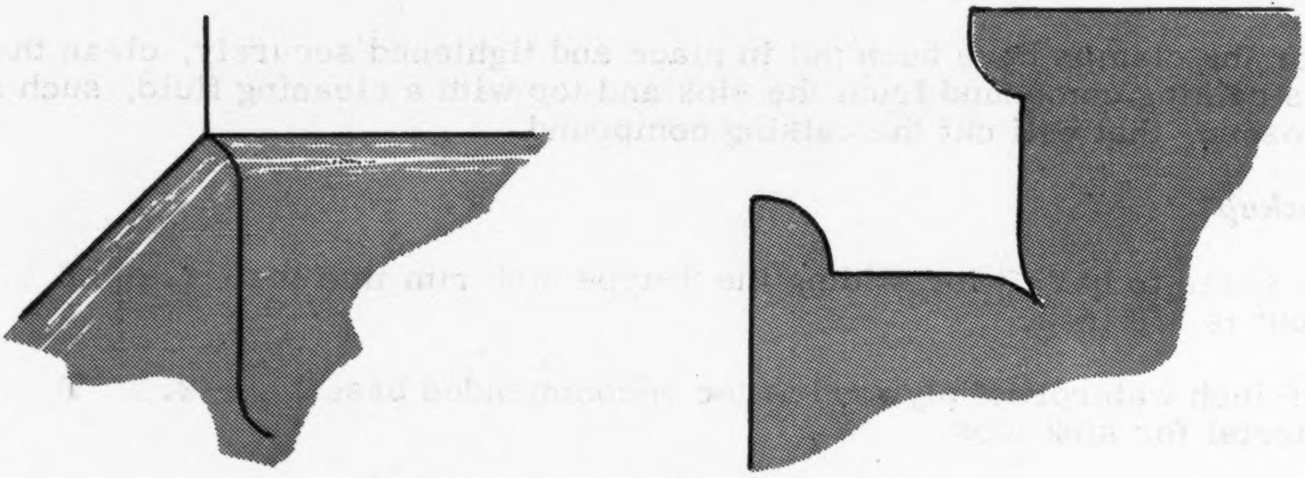


Fig. 107. Rolled-over edge above back splash

- The bottom edge of the material used on a rolled front edge moulding that is square underneath should be sanded or filed smooth.

Joints and seams should be finished properly. If electrical heat is not available, the corner joints should be welded by pressing a heated knife blade against aluminum foil in the same way an electic iron would be used.

Setting T-type sink rim and sink. (See Fig. 1 in Unit B for an illustration of T-type sink rim.) When a T-type rim is installed, the leg part of the rim is extended down between the sink and the cutout in the plywood top and clamped onto the sink and counter top so that the sink is forced upward and the rim pulled downward against the counter top.

Leave a 1/8-inch allowance between the sink and the cutout to allow sufficient room to slide the rim into position. Use calking to make a waterproof seal at the edge of the sink cutout, where the rim will bear against the counter top, and on the underside of the rim that bears against the sink flange.

Maintain at least 1 inch between the sink and any obstructions below the sink top for installing the clamps. If this space cannot be obtained, take precautions to locate the sink cutout hole so that room will be left at the back of the sink for a clamp. Then groove or notch the edge of the cupboard top to make room for the clamps. Often at the side of a sink hole it is necessary to notch the upright supports to allow room for the clamps.

The various manufacturers of the T-type rim provide different methods for clamping the rim securely. Instructions on the method of installation are usually sent with the rim, but if not, it is possible to determine how the clamps are to be secured by examining the rim before installing it.

Installing a sink with slightly warped flanges is no problem. The pressure that the clamps bring on the underside of the sink forces the rim to the shape of the sink.

After the clamps have been put in place and tightened securely, clean the excess calking compound from the sink and top with a cleaning fluid, such as kerosene, that will cut the calking compound.

Checkup

The space to be left for sliding the T-type sink rim into the cutout is 1/8 inch. 1. T F

Half-inch waterproof plywood is the recommended base material for sink tops. 2. T F

Asbestos-backed counter top materials are preferred for areas where water is to be present. 3. T F

When a T-type sink rim is to be used, the cutout should be 1/4 inch larger all around the sink than for other types of installation. 4. T F

When edge moulding material is to be installed, the plywood top should be cut back 1/2 inch from the edge of the cabinet. 5. T F

Edge moulding should be applied with contact cement and finishing nails. 6. T F

To help preserve the usefulness of the brush used for applying contact cement, keep it in a container of turpentine between uses. 7. T F

A contact cement of a color matching the material should be selected for use on rolled edges. 8. T F

In pressing materials onto surfaces where contact cement has been applied, press from the back of the installation toward the front. 9. T F

Calking compound should be applied to the underside of the top horizontal flange and the upper surface of the bottom horizontal flange of a T-type sink rim. 10. T F

TOPIC 3— WALL COVERING

Assignment ⋮ Installation Manual, Armstrong Cork Co., Chap. 23.

- What types of material are commonly used for all wall covering?
- Of what basic materials are laminated plastics composed?
- What are the principal applications of plastic wall tile?

Introduction

The floor covering installer is sometimes called upon to install wall coverings. These may be regular floor covering materials--most often cork tile--or they may be some of the many materials made especially for wall covering. In this category are linoleum materials made in a lighter gauge than those for the floor, vinyl sheet goods in a lighter gauge than those for the floor, plastic-surfaced materials with a linen backing, laminated plastics, and various metal and plastic tiles made especially for wall covering.

Related Information

Laminated plastics. A laminated plastic consists of layers of paper which are impregnated with a plastic resin and then compressed under heat to form a hard brittle sheeting. (If the material is to be made in a "forming stock" to be used in coving or around corners, the laminated material is a thin creped paper.) Above this base is a decorative or finishing surface consisting in most cases of a photographed pattern. Over this layer is a "wear" layer of clear, hard, glossy plastic (melamine).

The areas where this material is most widely used are desks, tables, counter tops, and sinks. Occasionally it is used for the walls around bathtubs and showers.

Sheet sizes of laminated plastics most readily available range from 24" × 72" to 4' × 16'. The material is available in numerous attractive colors and designs, the wood tones being the most expensive.

Plastic wall tile. Plastic tile is a wall-covering product that is moulded rather than laminated. Its main ingredient is a plastic resin. It is available in various colors and designs, and in the usual field tile size of 4-1/4" × 4-1/4". It is also available in different sizes of feature strips and borders.

Principal areas of use are bathtub enclosures, showers, bathroom wainscot, and areas such as behind stoves and refrigerators. It is also used as a wainscot in kitchens. It should not be installed on or near areas exposed to heat because plastic will melt under high temperatures.

Metal wall tile. Metal tile is made of a pressed aluminum or steel base, coated with a high-gloss enamel paint. Sizes and colors generally are the same as those of the plastic tile. It may be used in the same areas as plastic tile.

Wallboard. The name "wallboard" refers to the many types and brands of pressed paperboard used as wall and ceiling coverings. Most wallboard consists of a rigid pressed paper backing with a high-gloss enamel surface.

Wallboard is available in a variety of colors ranging from pastels to the deep tones. It may be either plain, with two or three horizontal lines on a sheet, or in a tile block design. All brands average 1/8 inch in total thickness and are available in sizes from 4' × 4' to 4' × 8'. Because of the brittle enamel surface, wallboard edges and seams are usually covered with metal. When installed properly, wallboard makes a permanent, easy-to-clean, and decorative wall. It should be installed with the special adhesives manufactured for the purpose.

The principal areas where wallboard is used are the kitchen and bathroom walls and ceilings and shower stalls and tub recesses.

Checkup

In areas of interest to the floor covering installer, laminated plastics are used principally for __1__ and __2__ work.

1. __________
1. __________
2. __________

The base of a laminated plastic consists of layers of paper impregnated with a(n) __3__ __4__.

3. __________
4. __________

Compressed under heat, these layers form a(n) __5__ sheeting.

5. __________

A(n) __6__ surface is added to this sheeting.

6. __________

The top layer is clear __7__.

7. __________

If the plastic is to be forming stock, the base layer of laminated plastic is __8__ paper.

8. __________

The most expensive designs are the __9__ tones.

9. __________

Plastic tile is __10__ rather than laminated.

10. __________

The usual size of plastic tile is __11__ square.

11. __________

Plastic tile is not resistant to __12__.

12. __________

Metal wall tile is made of a pressed __13__ or __14__ base.

13. __________
14. __________

Metal tile is surfaced with a high-gloss ___15___. Its uses are approximately the same as those of the ___16___ tile.

15. __________
16. __________

The name wallboard refers to a class that includes many types and brands of ___17___ ___18___.

17. __________
18. __________

The average thickness of all brands is ___19___.

19. __________

The ___20___ and ___21___ of wallboard are usually covered with metal.

20. __________
21. __________

Wallboard should be installed with the special ___22___ manufactured for the purpose.

22. __________

TOPIC 4— INSETS

Assignment Installation Manual, Armstrong Cork Co., Chap. 17.

Introduction

- What are the two principal types of insets?
- What skills are required to cut and install an inset?
- How does the installation of a factory-cut inset differ from that of one that is custom made?
- What are inset templates and how are they used?

Floor covering firms must have installers who can install a particular pattern or a designed inset in a regular installation. Because of the extra detail involved in a job of this type, a charge is added to the regular installation price. Skill in cutting is required in working with insets. All cuts must be made with a sharp knife, and the knife point must be held in a vertical position. Sometimes the installer may have to cut the insets, at other times he may be required to install precut insets.

Customers who purchase jobs with insets or special layouts are usually critical of workmanship, but most appreciative when the product meets a high standard of perfection. The skill required is emphasized, for the mechanic's ability to do quality work must be fully displayed in doing custom work.

Related Information

Installation of factory-cut insets. When an inset can be obtained precut from the manufacturer, setting the inset is not too difficult for the average mechanic. Follow this procedure:

1. Use insets of the same gauge material as the field into which they will be set. If this is impossible, use felt under the field material or inset, depending on which needs the extra thickness.

2. Determine the location of the inset before laying the field.

3. Make sure the inset will be square with the room itself (unless an irregularly placed installation is desired). This can be accomplished by striking center lines on the floor or felt. Divide the inset into four equal parts. The lines on the inset and the center lines on the floor should line up perfectly.

4. Roughly trace the outline of the inset on the floor. Do not apply adhesive on the area to be covered by the inset.

5. Install and finish the field material.

6. Strike the center lines again on the completed floor in the same way as was done previously on the floor or felt.

7. Lay the inset in position on top of the field material and line up the cross lines so inset will be in the position planned.

8. Fasten the inset to the field material with an adhesive tape so that it will remain in position while the outline is scored on the field material.

9. Score the field material along the perimeter of the inset using a very sharp tapered knife blade and making sure the knife is held in a vertical position at all times. Remove the inset and cut out the field material.

10. Since the inset area was not covered with adhesive when the floor was prepared for the field material, the cutout in the field material can be removed easily and adhesive then applied to the area thus exposed.

11. Place the inset in the opening. Then roll the inset.

12. All insets are held together with tape so they will not separate during shipment. Remove this tape carefully and then clean the inset.

13. The last step is to make sure all edges are flush; if not, use a hand roller or the smooth head of a hammer to finish the job.

Handmade insets. Certain jobs require special hand-cut insets. The first task is to draw the design and cut it out. Next transfer the design onto the field material at the location where the inset is to be installed.

Several methods are used to reproduce the design on the material. The desired image may be projected and outlined on paper or on the floor. Carbon-back transfers may be purchased for the reproduction. One of the most popular methods of making designs is to use a template containing the basic design elements to reproduce the designs desired.

Templates. The following procedure is practical when using a template:

1. Work out the desired design on a piece of paper, making sure it is the actual size of the inset. This will be used as a guide for the layout on the field (which has already been fitted into the area but not pasted down).

2. Place the template over the inset colors and cut out all insets. Use a pin vise or scribing point to mark the material, holding the point tight to the template at all times.

3. Place the template on the field, using the same procedure outlined in No. 2, and cut out the material from the floor covering.

4. Pull back field for applying the adhesive. After the field has been replaced, drop the inset segments into their positions and roll the flooring. In designs where a large number of segments are used, it is advisable to tape the various pieces into the cutouts in the field material and install the covering as a unit.

5. Hand-roll and clean the inset itself, making sure all surfaces are flush.

Inset design transfers. Designs can be drawn on heavy paper and, with the use of carbon paper, transferred onto the inset colors. The cut inset is then used as a template to trace the design on the field material.

Checkup

Insets are usually installed at no extra cost to the customer. 1. T F

All insets are precut by the manufacturer. 2. T F

The knife is always held at an angle with the vertical so a proper cut can be made. 3. T F

The exact location of an inset is usually determined before flooring material is laid. 4. T F

The gauge of the inset is of small importance to the installer. 5. T F

Insets must be installed in a room before the field material has been laid. 6. T F

Templates are used to advantage in designing insets. 7. T F

Adhesive tape is used to hold segments of an inset together during shipment. 8. T F

Great skill is required in doing the outlining for the installation of insets. 9. T F

Factory-cut insets are pasted at the same time as the field. 10. T F

TOPIC 5— ROTOGRAVURE SHEET MATERIAL

Introduction

- What underlayments or subsurfaces are considered suitable for the installation of rotogravure material?
- How is the pattern applied to rotovinyl, and how does this affect its durability?
- What is considered the best way of cutting rotogravure sheet material?

One of the relatively new floor covering materials on the market is felt-back--or rotogravure--vinyl. This sometimes has an asbestos fiber base rather than felt, but the characteristics are the same. Although there are slight differences in processing, a photosensitive layer has been applied to the base of this material, upon which is photographed a pattern. This layer in turn is covered with a clear vinyl overlayment. Since the pattern does not go clear through the material, any scrape, scuff, or laceration of the surface invariably destroys the appearance of the covering, and the pattern cannot be "rubbed back in."

Related Information

Preparation of floors. Felt-back vinyl may be applied over old linoleum if the linoleum is well adhered and smooth, and the surface is sanded to remove any wax that may be on it.

Plywood is a suitable underlayment, if it is of underlayment grade or is an exterior type plywood. Nailing the underlayment should be done with ring shank nails or with "power cleats." In case the latter are used, they should be driven at shorter intervals than is necessary if ring shank nails are used.

Concrete, tile, and terrazzo floors that are in contact with the ground are suitable for the installation of rotogravure sheet goods if they have been properly prepared. However, depressions (in concrete, wood, or metal floors) that cannot be eliminated by sanding should be filled with a nongritty latex-type filler before the vinyl is laid.

Handling and layout. To make a smooth cut on a felt-back vinyl, the material should be cut from the back.

Felt-back vinyl may be handled at lower temperatures than most other sheet goods. However, the temperature must be high enough so that the adhesive will work.

If the pattern allows, alternate sheets should be reversed so that each seam is composed of material from the same side of the roll. Color shift at a seam may be avoided by this procedure.

Installation. A recommended waterproof adhesive should be used to apply the material. A fine-notched trowel is best, and the coverage should be 25-30 square yards per gallon. The best method for cutting seams in vinyl is double-cutting, using a utility knife against a straightedge. For light-colored patterns, the seam is cut dry and then a white cement is spread down the seam area. When the seams are cut wet, the installer must be sure to reapply cement where the bottom trimmed piece is pulled up.

Vinyl wear surfaces may be welded by use of a special material to produce a waterproof seam. The welding material, which is applied with a dauber, actually dissolves the wear surface on both sides of the cut. The sides should then flow together and, upon drying, produce a continuous surface. After refinishing the treated area, which will appear much glossier than the surrounding area, the installer must restore the finish to match the untreated areas. This is done by rubbing lightly with powdered pumice.

Like all other sheet goods, felt-base vinyls must be rolled in both directions with a 150-pound roller immediately after installation.

Checkup

Felt-base vinyls may be applied over terrazzo floors. 1. T F

All cutting should be done from the top of the goods. 2. T F

Felt-back vinyls require higher temperatures for handling than most sheet goods. 3. T F

If the pattern allows, alternate sheets should be reversed. 4. T F

Seams should be straightedged and butted. 5. T F

TOPIC 6— STATIC CONDUCTIVE FLOORS

Assignment How To Install Static Conductive Linoleum, Congoleum-Nairn, Inc. (Installation File B-1464).

Introduction

- What is the reason for using static-conductive floor covering?
- How does static-conductive floor covering reduce the chances of fire and explosion in certain hazardous locations?
- What are the grounding procedures used for the two types of static-conductive materials?

Static electricity is a grave hazard in the presence of explosive vapors, combustible material vapors, explosive dust, or any other substances which are combustible with oxygen. In hospitals, missile propulsion fuel labs, and other areas where volatile substances are present, explosions and fires are a constant threat to safety. These explosions and fires are often caused by the ignition of combustible gases from electric sparks. The chance that this will happen can be substantially reduced if personnel and equipment are grounded to a static-conductive flooring.

A static-conductive floor covering should be used to:

- Offer maximum protection to those working with explosive materials.
- Avoid annoying static discharge shocks to those working with high-speed machines that build up static electricity.

Related Information

Two types of static-conductive floor covering are available, sheet linoleum and vinyl tile. The installation of either of these products differs very little from that of any other vinyl tile or linoleum, with the exception of the processes of making the installation conductive and of grounding it, if that is necessary.

Static-conductive linoleum. Static-conductive linoleum is manufactured in 6-foot wide sheet goods only, 1/8 inch overall gauge on a burlap back, weighing approximately 7-1/2 pounds per square yard. The linoleum mix has "built-in" electrical conductivity properties. The sheets are "tied" together at one end of each seam with a nonferrous metal connector placed under the sheets, bridging the seam. The entire floor may then be grounded by connecting the floor material to a ground.

Applying static-conductive tile.* Different manufacturers recommend different ways of installing static-conductive tile and different means of making it conductive. The method that is described herein is recommended by the manufacturer of one widely used brand of such tile. The important consideration for the installer is that he follow the instructions of the manufacturer of the tile being installed and at the same time produce a product that meets the specifications for the job.

The adhesive used with static-conductive tile is a chemical-setting type, and therefore it is necessary to work within the time limit shown on the container. With a notched trowel, spread the adhesive in strict accordance with the directions on the side of the container. Spread at the rate of 175 to 200 square feet per gallon for either 1/8-inch or 3/16-inch static-conductive tile.

First, spread the adhesive on a small area, starting at one of the chalk- or guidelines. Copper foil ribbons of .0025 gauge and 1-inch width are furnished with static-conductive tile. These ribbons are laid on top of the freshly-spread adhesive as the tile is being laid so that they run in one direction under and along the center of each course of tile. The ends of the foil ribbons are lapped over an inch or two wherever a joint is made to assure continuous conductivity. Avoid allowing any adhesive to get between the copper foil ribbon and the tile.

Press the tile into the freshly-spread adhesive and tightly against adjacent tile to assure a tight-fitting and water-tight installation, but take care to prevent the adhesive from spreading into the joints between the tile. Cut the last course of tile slightly oversize and force the tile into place so that all the rows of tile are compressed.

As the installation of the tile is being made, roll each area completed, and for about 20 minutes after all the tile has been installed, roll the entire area with a standard, 150-pound, three-section roller, to assure proper contact between the tile and the adhesive.

Grounding static-conductive tile. Grounding is not ordinarily necessary. However, if it is required by the authorities, extend the foil ribbons a few inches beyond the tile next to the wall. Fold each ribbon around a 1/2-inch strip of copper and crimp or punch it into the copper strip to make good contact. This 1/2-inch strip of copper can be made by folding 1-inch ribbon. Extend the copper strip around the room under the cove base or baseboard and attach it to a cold water line or other approved ground.

If grounding is prohibited by the local code, do not locate the copper tapes where they will be in contact with a ground.

Checkup

High-speed machines build up static electricity. 1. T F

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*This material has been adapted from Material and Installation Specifications (Technical Bulletin No. 1, May 1, 1959; Robbins Floor Products, Inc., Tuscumbia, Ala.).

The primary function of conductive flooring is the elimination of static electricity. 2. T F

Static-conductive linoleum is manufactured in both standard and heavy gauges. 3. T F

The conductive properties of static-conductive linoleum are contained in the backing. 4. T F

In installing conductive tile, adhesive should be spread over the entire area to be covered before any tile is laid. 5. T F

Copper foil ribbons used in conductive tile installation are laid on top of the adhesive. 6. T F

Care must be taken to be sure the copper foil ribbons are directly under the edges of each course of tile. 7. T F

Three cross courses of copper foil ribbon are required in each room laid with static-conductive linoleum. 8. T F

Grounding the entire installation is not usually necessary. 9. T F

The last course of tile should be cut to be slightly loose to prevent peaking of the joints. 10. T F

unit I

REPAIR AND MAINTENANCE

The repair of floor covering material after it is installed is also part of the installer's work. Most of this work is necessitated by damage to the covering--tears, burns, dents, discoloration, and the like--and the journeyman must be familiar with the characteristics of each kind of material used for floor covering to know how best to effect a satisfactory repair.

Although the installer is not called on to maintain floors, he must nevertheless be able to advise owners on the preferred or recommended methods of cleaning, waxing, and otherwise maintaining a resilient floor covering to protect its surface and prolong its life.

TOPIC 1—REPAIR OF SHEET MATERIALS

Introduction

- Why is knowledge of how sheet materials can be repaired important to the installer?
- What are the prescribed methods of repairing rotogravure floor covering?
- What are the characteristics of linoleum that make it more easily repaired than most other floor coverings?
- How does the repair of rubber and cork tile differ from that of vinyl and linoleum?

The installer of sheet materials must know how to make corrections, alterations, and repairs in completed installations and have the skills he needs to do each type of job well. High-quality work on such jobs reflects favorably upon the floor covering firm by which the installer is employed and, in doing so, helps to increase the sales of the firm. And in helping increase these sales the installer is also improving his position with the firm and helping to create job opportunities for other installers.

In making a correction, alteration, or repair in a completed installation, the installer should try at all times to keep the customer pleased. He can do this by being courteous and considerate and doing his work well.

Related Information

Linoleum. Because of the unique construction of linoleum, several features favor the installer when a repair is to be made. One of the first things is that material does not have the high gloss that is present in most vinyls. Also, most linoleum has a pattern of some type, such as a marbleization, spatter or speckled effect, or a straightline or embossed design. These patterns tend to hide replacement sections. Where removal of a section is necessary, the thickness of the material makes removal in one piece easier than on a thinner material. Also because of the heavier gauge (or thicker body) of the material and the higher resiliency, cuts and punctures tend to close up and be less apparent than in vinyls. When heat is used to soften the adhesive, shrinkage is usually slight. However, linoleum does shrink if it is exposed to moisture for long periods of time.

A filler may be made from material similar to that being worked on so that the filler will be the same color as the material to be repaired. The steps are as follows:

1. Scrape the cork portion of a piece of the same type of material as that to be repaired, with a back and forth motion similar to the

motion with which a barber sharpens a razor on a strop. Only experience will tell how much material to make up.

2. Rub the shavings of linoleum between the palms of the hands to a fine dust.

3. Add either a paste wax or lacquer to the dust to make a knife-consistency paste.

4. Rub the paste filler into the area to be filled and wipe off the excess with a clean wet cloth.

NOTE: Be sure to mix the materials on a clean surface which will not dissolve when the vehicle (wax or lacquer) is added to the dust. Also be sure the instrument used to mix the two products together is clean and free of any foreign materials which might dissolve when subjected to the vehicle.

Rotogravure. Rotogravure sheet materials may be repaired in two ways, depending on the nature of the required correction.

First, in the case of a burn on rotogravure vinyl or a slightly open joint in the floor covering that collects foreign matter and causes the material along the joint to discolor, it is advisable to find out what material the manufacturer recommends for use in removing blemishes of these kinds.

Second, if the blemishes in the surface cannot be removed by the use of fluid made available by the manufacturer, or the material has been gouged or indented, a cut may be made, following a predetermined outline, with a sharp razor knife held perpendicular to the damaged surface. This cut must be made with care because of the lack of body materials in vinyl and because the material tends to ball or roll up in front of the cutting edge of the razor knife.

Different procedures for removal of the damaged area must be used, depending on the type of adhesive used in the original installation. Usually a combination of low heat and a razor blade in a holder (similar to a window-scraping device) will prove satisfactory. The use of excessive heat must be avoided, for it may cause the surrounding area to discolor or to be otherwise damaged. Also, as in the case of all vinyls, shrinkage is usually the final result when heat is used. A cold, wet cloth should be kept nearby for use in controlling the heat level of the repair area.

Avoid the use of abrasive materials such as sandpaper to remove the sharp edge or ridge which will appear when the vinyl is cut. The use of abrasives will result in a scuffed and dull surface as well as in removal of the patterned portion of the material.

Vinyl. All vinyls can be handled in much the same way as rotogravure vinyls, with particular attention given to the heat problem.

Even when the pattern of the material that must be repaired is nondirectional, care must be taken to install the replacement section with the grain running in the same direction as that on the sheet repaired. This is necessary because some materials have a definite "lay," and when another piece of the same material is fitted in, an off-shading or apparent discoloration results unless attention is given to laying the pieces in the same direction.

As is the case with all floor coverings, the manufacturer's recommendations regarding adhesives should be followed.

One method of eliminating the sharp edge on a seam or the peaking of a seam is to lay a strip of aluminum foil over the repair or seam, iron over the foil with the tip of a household electric iron set at its highest temperature, and then wipe the area with a clean cloth that is dampened with cool water. Keep the iron moving slowly over the foil.

Rubber. Sheet rubber is one of the more easily repaired floor coverings because of its thickness and resiliency. It is not readily affected by heat or moisture, which makes it quite stable, and it is usually easy to remove from the floor for it generally does not tear or crack under the stress of removal. The repair area must be clean and dry before the repair is made.

Cork. The removal of the section to be replaced is probably the most difficult part of repairing a cork floor. This is because cork has a tendency to disintegrate or break up when subjected to stress. Inasmuch as cork is manufactured usually in plain colors, it is very difficult to conceal a repair easily. Sometimes a light sandpaper and wax treatment will camouflage the repair. A fine grit sandpaper with a paste wax vehicle must be used for this work or scratches will show up later when dirt or foreign materials are introduced to the area of repair.

Wall coverings. Wall coverings are materials of lighter construction than conventional floor coverings, although some floor coverings are installed on walls. Usually repairs of lightweight wall coverings include removing buckles or inserting a square of material where the covering has been damaged.

Buckles may be corrected by injecting a watered-down solution of adhesives into the buckles with a syringe. This is done by inserting the needle into the buckle, forcing the adhesive throughout the buckle area with a wall roller, and then rolling the buckle area from the outer edge or perimeter of the buckle toward the pin hole left in the wall covering in making the injection. Adhesive forced to the surface of the wall covering is then wiped off with a clean cloth. Do not use a wet cloth until it has been determined that the wall covering will not be damaged by moisture. Do not use fingers to spread the adhesive under the buckle as this will leave marks in the wall covering.

If a section must be replaced because the wall covering is damaged, use the following procedure (or a similar method of repair):

1. Cut away the wall covering approximately 1 inch outside the damaged area.

2. Fill the damaged subsurface, if necessary, with proper filler material. Make sure that the surface is smooth and level.

3. Take a piece of the material to be used for repair and either staple, thumbtack, or by any other method temporarily secure it to the wall subsurface.

4. Doublecut through both layers of materials (replacement and existing wall coverings) with a straightedge and razor knife held vertical to the surface. Then remove the temporary securing devices, the replacement material, and the existing wall covering out to the seam cut.

5. Carefully spread the adhesive over the replacement area, being sure not to allow any of the adhesive to contact the surface of the existing wall coverings. Set the replacement material in place and roll the surface with a wall roller from the center of the repair outward toward the perimeter of the damaged area. Wipe off any adhesive on the surface of the wall covering with a clean cloth. Do not use a wet cloth unless it has been determined that the wall covering will not be damaged by moisture.

Checkup

When excessive heat is used on vinyls, ___1___ in the material is to be expected. 1. ________

A(n) ___2___ knife should be used in cutting rotogravure materials. 2. ________

Sandpaper will ___3___ the pattern if used on rotogravure materials. 3. ________

Damaged rotogravure materials may be removed by using low heat and a(n) ___4___ ___5___ device. 4. ________ 5. ________

Because linoleum does not have a(n) ___6___ ___7___ finish, a repair can usually be hidden better than on ___8___ materials. 6. ________ 7. ________ 8. ________

Very little ___9___ occurs when linoleum is subjected to heat. 9. ________

When linoleum is subjected to water for a long time, ___10___ results. 10. ________

Wax or ___11___ may be used in making a filler material for linoleum. 11. ________

The sharp edge on a seam may be reduced by heating a(n) ___12___ of ___13___ with a household ___14___. 12. ________ 13. ________ 14. ________

A(n) ___15___ may be used to inject adhesive into a buckle in a wall covering. Fingers should not be used to spread the adhesive because they will leave ___16___. 15. ________ 16. ________

Sheet rubber is repaired more easily than most floor coverings because of its 17 and 18 .

17. ____________

18. ____________

Sandpaper and 19 may be used to camouflage a repair in cork material.

19. ____________

The proper method of cutting a patch for a damaged wall area is 20 .

20. ____________

TOPIC 2—MAINTENANCE OF FLOOR COVERING

Assignment Installation Manual, Armstrong Cork Co., Chap. 25.

Introduction

- Of what particular importance to the installer is the proper maintenance of floor covering?
- How should floor wax be applied for best results?
- What is the most important characteristic to look for when choosing a floor cleaner?
- What conditions should indicate the frequency of waxing?

Although the floor covering installer does not maintain the floor he installs, he should know how it can be done properly. Two of the important principles to follow in preserving resilient floors are to avoid (1) washing them too often; or (2) applying layer upon layer of wax.

Checkup

The installer should know the ___1___ and ___2___ procedures for each type of floor covering. 1. ________ 2. ________

Wax should always be applied in ___3___ layers. 3. ________

Frequency of waxing can be determined by the particular ___4___ each floor bears. 4. ________

All resilient floor coverings will wear better if they are ___5___ periodically. 5. ________

Furniture with ___6___-___7___ rests tends to indent the floor covering. 6. ________ 7. ________

The wax or finish used on resilient flooring should contain no ___8___ harmful to the surface. 8. ________

Washing powders that contain ___9___ and ___10___ should not be used on resilient floors. 9. ________ 10. ________

INSTRUCTIONAL MATERIALS

The first listing of each publisher includes the address from which publications may be purchased. List prices are given where known. School prices may be obtainable in some cases, through the instructor.

BOOKS RECOMMENDED FOR EACH APPRENTICE

Floor Covering, Part 1 (Workbook and Testbook). Sacramento: California State Department of Education, 1965. See price list.

Construction Safety Orders. Sacramento: California State Department of Industrial Relations, Division of Industrial Safety, 1957. (Documents Section, Department of General Services, P. O. Box 1612.) $1.00

How to Install Static Conductive Linoleum, Congoleum-Nairn Inc. (Installation File B-1464.) Request from nearest regional office.

Installation Manual, Armstrong Cork Company. (Request from nearest regional office or, if not available, request from H. C. Long, Armstrong Cork Co., Lancaster, Pa.)

FILM

Skilled Hands and Skilled Installers (16 mm. color sound films), Congoleum-Nairn Inc. If films are not available, the following pamphlets contain many illustrations from the films:

How to Install Self-Coved Flooring, (Installation File B-1365). How to Install Inlaid Vinyl Flooring with White Shield Backing, (Installation File B-1560). Films and pamphlets should be requested from nearest regional office.